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The DOCTRINE *of* LIGHT, SIGHT, *and* COLOURS, *and our* Notions *of the* Nature *of them Reform'd.*

Or, An

ESSAY

To ſolve and explain the PHENOMENA of

VISION,

BY A

New Hypotheſis;

And to ſhew,

That LIGHT is not by any Rays or Emanations from the SUN.

By Mr. PLACE.

Being another PART of his *Philoſophical Creed.*

> *As for the Form of Light, that there has not been made a due Inquiry thereof, may well be cenſured as a ſtrange Overſight; for neither in the Perſpective, nor elſewhere, is there any thing inquired concerning Light of any Worth or Weight.*
>
> *It muſt needs be, (ſeeing Viſion cannot be conveyed without Light) that there is a native and inbred Light in the Air, altho' feeble and weak, yet ſuch as may be proportioned to the Optick Beams of ſuch Creatures, and may ſuffice them for Sight.* [Ld. *Bacon* Book iv. Advancement of Learning.

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THE DOCTRINE OF LIGHT, SIGHT, AND COLOURS, *&c.*

THE common Diſtribution of Matter into the Four Elements, as comprehending all its ſpecifick Modes, and eſſential and fundamental Differences, that is derived down to us from *Ariſtotle*, is a great Misfortune in our Philoſophy; it is from Confinement by Prejudice to this old Diſtribution, that ſeveral of the moſt conſiderable and important Parts of Nature, and that are the Cauſes of Effects of the greateſt Conſequence to Animal Life, are *ex hypotheſi* excluded, and lie conceal'd and unacknowledged; tho' continually and notoriouſly manifeſting themſelves to us: Whilſt all that is not viſible and tangible to us, is confounded together, and paſſes under the common Name and Notion of Air, as conceived to be but one Part of the Four, one uniform and homogeneous Body and Conſtitution, and one individual Exiſtent. Which is, indeed, a Complection of ſeveral Conſtitutions, whoſe Subſtances, or their eſſential Forms, are not only diſtinct from that of Air, and of the other Three Elements, from which they exiſt in Separation, but no leſs from that of each other; and each of them more conſiderable than that which bears the Name of the Whole. The Four Elements, however different from each other they are, yet are transformable into each other, and are compounded and united together, ſo as to become Parts of the ſame Individuals, mixed up of them all, as all elementary Bodies are: But there is that fundamental Diverſity of Subſtance or Eſſence in each of theſe Conſtitutions, both from that of the Elements, and from that of each other, as admits of no Union or Mixture by Compoſition, ſo as to become common Ingredients to coexiſt as an Individual, but each preſerves the Severality of its Nature and Exiſtence to itſelf, pure and unconfuſed, and proper to itſelf.

It is from Ignorance of theſe Syſtems, that our Philoſophy ſtands upon a wrong Bottom, and proceeds upon falſe Principles: And ridiculous Doctrines are entertained, and infinite Pains is waſted to ſolve *Phenomena*, and account for Effects, whilſt the true Cauſes that would eaſily and obviouſly do it, are overlooked, and lie unſuſpected under their Noſes, tho' evident enough.

Theſe Syſtems I have, upon another Occaſion, vindicated the Exiſtence of, and called by the Names of, 1. *Aëreal*; 2. the *Magnetick*; 3. the *Vocal*, inſtituted for the Communication of Sounds; and, 4. the *Viſive*, to tranſact the Affair of Viſion.

It is this laſt only, the *Viſive Syſtem*, that loſt and buried under long Prejudice, is the Subject of my preſent Deſign, that I ſhall endeavour to vindicate the Exiſtence of, againſt thoſe idle Notions and Doctrines that ſupplant it, and which the Learned have been forced to call in, or take up withal, to ſupply its Place, and upon which the preſent Doctrine of our Opticks proceeds as its Principles. And ſtrange it is, that ſo eminent and wonderful a Part of Nature, that has ſo near a Relation to us, ſurpaſſing for its Uſes and Effects, and deriving to animal Life all thoſe Notices of Bodies that make the Univerſe beautiful and pleaſant to us, ſhould want a Diſcoverer, and that in our Age, ſo curious and inquiſitive, that pretends to have carried natural Knowledge to the Height, yet the *Phenomena* of Light and Viſion ſhould be reſolved into ſuch

Principles, and ſolved by ſuch a Set of precarious Notions, as they are.

By the *Viſive Syſtem* therefore, I mean, a vaſt and immenſe Frame of Matter eſtabliſhed, incomparably, ſubtle, and refined, beyond our Conception and all that falls under the Notices of our Senſes, our Ideas, and even Imagination; that runs perpetually every-where ſtretched, not only thro' our elementary Maſs, but immeaſurably wide beyond it, thro' Spaces of Orbs, and Regions ethereal, and probably celeſtial too, extended and expanded from us up to the higheſt Stars; for ſo far, by Evidence of Senſe and actual Viſion, we experience it to reach; to whoſe Magnitude, conſequently, the Sun and Stars together are but comparatively diminutive Specks, not to ſay dark ones too, to us, without it. This Syſtem I take to be Light ſubjective, Light material and ſubſtantial; that firſt Creature of God, that he called out from the Confuſion of the yet inform Maſs of created Matter, eſſentiated with its Form, and fixed in its Station, and fitted for its Office, and perfected, as the Beginning and Foundation of natural Order and Digeſtion; whilſt the reſt lay yet wild and chaotick. So alſo was it the firſt that had the ſolemn Form of divine Approbation pronounced over it, of being *Good*, *Gen.* i. 4. This Priority of *Light's Creation*, ſhews the Created to have been ſome eminent Member, and top Part of the World, to which this Preference of Creation was due, from the Dignity and Excellence, as well of its Nature, beyond other created Subſtance, as the Part of diſtinguiſhed Uſe and Office. And the Hiſtory of the Creation better ſuits with the Light that was firſt created, being ſuch a Syſtem of Matter as this, than to the preſent Notion of Light and Viſion, with which it is not eaſily reconcilable.

The ſolemn Form, as well of Evocation, (*Gen.* i. 3.) by which this Light was made, as that of particular Approbation, together with the After-care to preſerve it ſingle, unblended, and uncompounded with any contrary or heterogene Matter, by a particular poſitive Act of Separation and Diſtinction; *Ver.* 4. *God divided the Light from the Darkneſs*; circumſcribing and keeping them aſunder by Bounds ſet, and a Law of Diſſociability; and the Solemnity alſo of divine Nomination, *God called the Light*, *Day*; oblige us altogether to think, that the Thing that was thus made, with all theſe Solemnities of Circumſtance, was not only Something that was real and ſubſtantial, but a top Being; and conſequently more in itſelf than a mere Quality, however abſolute or noble we ſuppoſe it.

Or if it was only a Quality, yet it could not be a Quality that was dependent on the Sun, or the heavenly Luminaries, or any Quality of theirs; either abſolute, becauſe they were not yet made; nor relative, becauſe there were yet no Eyes from whoſe Perceptions it was to reſult; and it muſt be Something independent on the Sun, and in whoſe Production the Sun had no cauſal Share; and is inconſiſtent with our preſent Doctrine and Notion of Light being an Emanation from the Sun, or the Stars being eſſentiated with it. And the Order of its Creation is one Inſtance, that Light *was*, and *may be*, without the Sun; unleſs we will admit of Accidents exiſting without their Subjects, and make an Argument for Tranſubſtantiation being good natural Philoſophy from it, as *Cornelius à Lap.* (*Gen.* i.) does.

But tho' it was a Subſtance, yet it is not neceſſary for us to think, that it was then firſt and properly created, and brought into Being, or then firſt eſſentiated with luminous Form and Property, its Matter being made before; but God's ſaying, *Let there be Light*, might probably refer to his calling it already created out of the Confuſion of the Chaos, and bringing it out thence collected together into a Body; as he firſt made the Water, and then collected it into Seas; and St. *Paul* alluding to this Act of God (2 *Cor.* iv. 6.) ſeems to have underſtood it as an Act of Eduction only of Light before created out of ſome blended Maſs, rather than of proper Creation: *God, who commanded the Light to ſhine out of Darkneſs*; as in like manner it is expreſs'd in the Book of *Eſdras*, (2 *Eſd.* vi. 44.) *Then commandedſt thou a fair Light to come forth of thy Treaſures, that thy Work might appear.*

And, (*Ver.* 4.) *God divided the Light from the Darkneſs*; that is, God having thus called out the luminous Subſtance from the Chaos into a diſtinct State of ſeparate Exiſtence; to preſerve it in that State, and to prevent its Relapſe into Confuſion any more, or Diſſipation; and to ſecure its native Purity, and Simplicity; he ſo moded it, that it ſhould not by any Union or Mixture be ſullied or corrupted by Compoſition with opaque Subſtance; but, tho' interſperſed every-where amongſt it, yet ſhould remain unſullied and untainted by any of its Particles adhering to it: To which Act of God, dividing *Light* from *Darkneſs*, St. *Paul* alludes, (2 *Cor.* vi. 14.) when he ſays, *What Communion hath Light with Darkneſs?*

(*Ver.* 5.) *And God called the Light*, which he had thus called out, and divided from Darkneſs, *Day*; *and the Darkneſs he called Night.*

That we ſhould not be miſled by the Sun's glorious Appearance to our Eyes, to aſcribe to him more than is due to him, God has lodged an original Caution in the Record of the Creation, to prevent our erring that way, which he foreſaw we ſhould be tempted to; and let us know, that the Sun

neither

neither is *Light*, nor the ſole or principal Cauſe of *Day*; but an Acceſſary to its Production; an accidental Auxiliary only, to help that *Light* which was made before it; the Effect of whoſe Virtue and Activity, Day is; to exert its manifeſting Splendor as to us, and quicken it into Senſation, by breaking thro' and diſpelling the Impediments that dark and opaque Subſtance among which it lies, damps and deadens its Illuſtration withal. Thoſe who would have this Day, that is aſcribed to Light as its Cauſe, to have been produced by the divine Architect, ſupplying by immediate Act the Preſence and Office of the Sun not yet made, as firſt playing himſelf, as by way of Trial and Experiment, upon the mighty Organ, fitted up in juſt meaſure the Changes and Alternations of Day and Night, and of the *Evening and Morning*, to ſee how it would go; pay a greater Deference to their Prejudice, that the Sun is the neceſſary, natural Cauſe as well of Light, as Day, than to the Text; which they would have no Occaſion ſo to conſtrue, were it not to force it into a Compliance with that Notion, which it gives full Evidence againſt: For *Moſes*, as he makes Light to be created by itſelf independent on the Sun, and three Days before it, ſo God himſelf gives the Name of *Day* to that ſame Light, as its proper Product, without any Notice taken of any Dependency of the Sun, that was not yet made. And we muſt be very in-

injurious to *Moſes*, as a prepoſterous Relater, if he made not only Light, ſuppoſed to be a Quality only, to be created without and before its Subject; but that Quality, as farther having its Effect actually produced, and named before its Cauſe yet had Being. From whatever Cauſes it might be, we muſt allow both *Light* and *Day* to have been, by *Moſes*'s Account, without the Sun, and before it was made; and when it was made, not declared to be the Cauſe either of Light, or of Day, or to produce it; but only *to rule over it* already made, and *to divide the Light from the Darkneſs*, to moderate and conduct it, and, by its Efficiency, to cauſe a juſt Adminiſtration and Diſpenſation of it thro' the Earth; and by its Influences, to temper with it the Qualities of the dark Elements. Alſo with regard to Frigidity and Inactivity, as well as Opacity, the Sun was added as an Auxiliary to the Syſtem of Light, not by making it *Day* in an abſolute Senſe, which it produced without it; but by making it Day reſpectively, by giving it, where it paſſed, that Superiority over Darkneſs, that the Infirmity of human, and the Generality of animal Eyes, required, as ſufficient to make it Day to them; and to give *Light upon the Earth*; where the luminous Syſtem, choaked up and ſheathed in dark Elements, made his Aſſiſtance neceſſary; but which was not wanted to purer Eyes, or purer Orbs and Regions. For the aſſigning to the Sun the Right of Preſidency over *Light* and *Day*, ſuppoſes that Light and Day were in Being before: And we may as well ſay, That the Moon is the Cauſe of Night and Darkneſs, becauſe appointed to rule over it, as the Sun to be the abſolute and uncondition'd Cauſe of Day or of Light, as its Fountain or Original, from his Office of Preſidency over them.

By the *Moſaick* Hiſtory, the Sun appears to be only an inſtrumental Cauſe of Light and Day, and that reſpectively as to us, and to our Globe of Earth; appointed to heighten the Activity of the viſive or luminous Syſtem, and to tune it up to a Degree that was ſuitable to the general Temper that God has thought fit to give to animal Eyes; to which, by acceſſional Influence, he qualifies and enables the luminous Subſtance to diſplay itſelf with Effect, being otherwiſe too feebly and languidly active, and inſufficient of itſelf, without this foreign Aſſiſtance added to it in our impure Atmoſphere, to conquer the adverſe Maſs of circumfuſed and interfuſed Elements, which deaden and ſuffocate its native Splendor to us, and clog it too much to affect our Souls with neceſſary Senſations, thro' Organs that are ſo coarſe as ours, and thoſe of the Generality of animal Eyes are.

God did not create two ſorts of Light, nor two ſorts of Day; but that Light which he firſt made was the very ſame individual

Light, both as to Matter and Form, with the common Light that now enlightens the whole World ; and the Day that he firſt made, and ſo called before he made the Sun, was the illuſtrative Effect of that very ſame Light, which now muſt therefore make it Day to us.

And conformably therefore to the created State of Nature, as to *Day* and *Light*, pointed out to us by the divine Record of the Creation ; I call that material and ſubſtantial Light, which God firſt made, *the Viſive Syſtem* ; whoſe varied Degrees of Motion, being heighten'd or ſlacken'd by the Preſence or Abſence of the Sun, or ſome leſſer or inferior Cauſes that are inſtituted to act in like Manner upon that Syſtem, make Light or Darkneſs, Day or Night to us.

And that the common Notion, and received Doctrine, That Light is derived and convey'd down to us from the Sun, and all the Conſequences by which the *Phenomena* of *Light*, *Sight*, *and Colours*, are at preſent ſolved, by Rays and Emanations iſſuing from that Planet as their Fountain, with the imaginary Refractions and Reflections of thoſe Rays, on which all our optical Knowledge turns, is vulgar Error, and groundleſs Imagination.

The concurrent Agency of the Sun to our Sight, is but accidental, and reſpective, with regard to our duller and imperfect State of viſive Organs, and to the Circumſtances of our foul Atmoſphere, and our Situation in it; which Impediments were they removed, and the Sun too, we ſhould ſee more clearly and evidently without him, by the viſive Syſtem alone, than now we do, as *thro' a Glaſs darkly only*, with him. That the Sun is not abſolutely the Cauſe of Light to us, but reſpectively only, with regard to the Temper of animal Eyes, we find by Inſtances in all Orders of Creatures, ſome of which of each Kind ſee better without the Sun, than we do with it: As amongſt Beaſts; thoſe that walk and prey by Night, Foxes, Badgers, Cats, Rats, Mice, Moles, Otters, *&c.* Amongſt Birds; Owls, Bats, *&c.* Amongſt Fiſhes; Eels, Lobſters, Crabs, *&c.* Amongſt Inſects, abundance; as Lice, Fleas, Silkworms, *&c.* that in the darkeſt Nights diſcern the ſmalleſt Things, ſpin and weave the niceſt Threads, and this tho' ſhut up in the cloſeſt Box; to the Eyes of ſome of which the Day, and Light of the Sun, is too much, blinding and dazling them; to thoſe of others, the Light of the Stars is ſufficient; and to others, the viſive Syſtem of itſelf alone, without any foreign Auxiliary. And who can think but a Toad, that is bred in the Middle of a Stone or Timber, having two fair Eyes, or a Maggot in a Nut, has in that his ſeeming to us dark Cell, the Uſe of them, and lives in the clear Day-light, by the viſive Matter permeating the Pores in Degree that is ſufficient for him? Nor is it im-

impoſſible but he may ſee, even thro' his ſolid Incloſure itſelf, ſince all Bodies have ſome degree of Diaphaneity: Nor do I ſee it without the Bounds of natural Poſſibility, that Lynxes are ſaid to ſee thro' Stone Walls.

The Neceſſity of the viſive Syſtem, to ſolve the *Phenomena* of *Light*, *Sight*, and *Colours*, appear to us farther,

Firſt, From the natural Condition that is eſſential to Senſation; that is, the Contact and Preſence of the Object perceived; and the impoſſible and impracticable Terms, that we now ſuppoſe ourſelves to ſee Things upon.

Secondly, From the Exceptions to which the preſent Doctrine of Light having its Original from the Sun, is liable, and from the manifeſt Inconveniences that attend it, being eſtabliſhed on Terms that muſt be ſuppoſed to make it out, that are unbecoming the divine Wiſdom to inſtitute, and not ſuitable to that Happineſs and Eaſe of Contrivance, with which the Laws of Nature are obſerved and allowed to execute themſelves in all other Caſes; which is, by the ſhorteſt and moſt compendious Way.

1*ſt*, The natural Condition of Senſation; which is indiſpenſably neceſſary to our perceiving Things without us, throws us upon the viſive Syſtem; without which we jog on indeed contentedly together, in the old beaten nonſenſical Road of traditionarily ſuppoſing ourſelves to ſee Things that we call diſtant, and that paſs for being a great way off from us, after a ſilly and unintelligible Manner, and which it is impoſſible for us to make out, or to reconcile to our own admitted Principles of Perception: For I take it for granted, that all our Senſations are but varied Modes of Feeling; and that we can perceive no farther than we can feel or touch Objects; and that we can feel or touch no farther than we really are, or than our Subſtance reaches: For to ſuppoſe ourſelves to perceive Things farther than our Subſtance reaches, and without our Circumſcription, is to ſuppoſe ourſelves to perceive where we are not, and to act or ſuffer where we are not; and, which falls into the ſame, with doing this when we are not. And as I can perceive no farther than I really and actually am, ſo neither can I perceive Objects, but where they really are; that is, be the Place that I ſee them in, their true or apparent Place only, it muſt be in that Place that I am preſent immediately to them, and touch them. For it implies the ſame Abſurdities on the Objects ſide, to be perceived by us where they are not, as in ours, to perceive them where we are not.

Our Perceptions, it is certain, are all wrought by immediate Contact, and the actual Preſence mutually of the Object perceiving and the Percipient to each other; which if any think fit not to allow, he will find it eaſier to deny, than to give any rational Account, how it can be otherwiſe.

And were this confeſt Principle but ſtuck to, and *Hypotheſes* and Solutions of the *Phenomena* of Light and Sight regulated conformably to it, it would inevitably ſet us right, and detect the Vanity of our preſent Way of thinking of thoſe Objects.

As for Example: I ſee the Sun or Stars, *&c.* that is, in true Philoſophical Meaning, where I now am on Earth; I feel and touch really and truly, not virtually or influentially, or ideally (which is all but nonſenſical Jargon, that we blindfold ourſelves withal) the very Sun himſelf, where he is in the Sky; and neceſſarily muſt do ſo to perceive him at all (tho' were it his Image only ſuppoſed to be ſtruck on ſomething intermediate, and ſo convey'd down to me, it would ſtill anſwer my Purpoſe as well, and as neceſſarily require the viſive Syſtem, to account for the Conveyance): So conſequently, whatever Doubt there may be which is the right Way by which this is brought about, and the Sun and I are brought together; yet there can be none, of that *Hypotheſis* being wrong, that pretends to ſolve this *Phenomenon*, without cloſing the putative and ſeeming Diſtance ſo called, that is between us, and making an immediate natural and real Preſence of the Object to my Soul; and this can no otherwiſe be done, Than either, 1*ſt*, By making the Sun's Body and its Subſtance to reach continuedly down to me:

Or, 2*dly*, By making my Subſtance and real Preſence, extend itſelf actually, and as continuedly, up to him.

Now this cannot be ſuppoſed to be done the firſt Way, by the Continuance of the Sun's Body and Subſtance down to us; becauſe it is not particular to the Sun only to be ſeen, at what we call a Diſtance, and a great way off from us; but 'tis common to the Sun with all other viſible Bodies, and remote Objects whatſoever: All which muſt be ſuppoſed in like manner to inlarge their Subſtances in Proportion to the Spheres of their Viſibility, and make themſelves equally continuous to all thoſe that perceive them: And ſo would introduce as many boundleſs, ſubſtantial Continuities, as there are Things in Nature; and ſo ruin all Circumſcription, that is the Principle of Individuification, and would make all Things to be as boundleſs as our Sight.

As to the Sun itſelf indeed, its Effects and Influences, and the Dependences that Light and Heat have upon it, are fair and colourable Appearances to make us fanſy, that that Contact of him, by which we ſee him, may be by ſome Production and Continuation of his Subſtance on his Side, down to us; and that he really reaches the Eye by ſomething from himſelf, that is ſtretched down from him; and enlightens us by ſome perpetual Fluxion, and continued Streams of his luminous Subſtance; ſuch as his imaginary Rays and Beams, that Men have poſſeſſed their Imaginations withal, are; and which vulgar Error has given Sanction to: But then, What ſhall we ſay as to dark Bodies, and to all other Objects, that have no ſuch Effects, no Influences, no Rays iſſuing from them, to furniſh the leaſt Ground to make us imagine that it is by their Subſtance being ſtretched and continued Home to us, that we viſibly feel them diſtant and remote? But be this Production and Continuation of Subſtance and Preſence on whether Side it will, it muſt be by ſome Appendixes or Supplements provided by Nature for that Purpoſe, that being grafted on and united, either to the deficient Objects, or to the percipient Subſtances, cloſes the Diſtance between them, and ſo fulfils the natural Condition of mutual Preſence, that is neceſſary to their falling under Notice. Now we cannot ſuppoſe theſe Appendixes to be on the Objects Side; becauſe then there muſt be as many and various Appendixes, to lengthen the Continuities of each, as there are different Objects; and this to anſwer no End at all to themſelves, having no Senſations, the inanimate ones I mean, nor any Advantage ariſing to them from the Inlargement of their Preſence to animal Eyes, with which on their Side they have no Buſineſs; for no natural Good accrues to Objects by their being perceived; that Good lies altogether on the Percipient's Side, where Life and Conſciouſneſs are. And as abſurd as it would be in the Affairs of ſocial Life, to ſuppoſe every Man obliged to find out, and go Home to thoſe with whom they had no Buſineſs or Concern, whilſt thoſe that are intereſted in the Correſpondence were to ſit ſtill: So would it be in natural Life, and the phyſical World, to ſuppoſe inanimate Objects brought home to our Eyes; and that our Eyes did not ſtretch themſelves to them, ſince the End uf the Communication is all on their Side, and on their Account.

Or ſuppoſing it to be true, as to the Sun himſelf, that the Advance is on his Side; that it is he that comes or ſends down himſelf to us, and that our Eyes reach not out beyond their Sockets, to meet the deſirable Correſpondent; yet ſtill this could only ſerve the Turn, as to our perceiving the Sun himſelf, nor could we by his Preſence perceive any Thing beſide that was not in like manner preſent to us: For if Perception is from Contact of the Object perceived, the Sun's touching me can no more make me ſee any thing elſe beſides himſelf that I do not touch, than the Feeling one Body, however eminent a Tangible it may be in itſelf, can make me touch ten thouſand others; and the Sun, tho' he were ten times brighter than he is, can no more help me to ſee a Dog, or a Tree, than a Dog or a Tree, by touching me, can make me ſee the Sun. I mean really and ſimply, in a natural Way; repreſentatively indeed, or by Compact, we may by perceiving one Thing, perceive another; as Originals in their Ideas, or Ideas in Words; but by the preſent Doctrine of Opticks it is impoſſible to make it out, how or why the Sun ſhould make us ſee other Things, that he neither repreſents, nor by any Agreement is to ſtand inſtead of.

And, I conclude therefore, that *that* Contact by which the Soul perceives Objects, that we call diſtant from us, by Hearing and Sight, is by its producing and lengthening out itſelf beyond the Bounds of its perſonal Circumſcription home to the Objects perceived, as to ſome particular Part of the Subſtance united to it, by which Bodies diſtant from it are touched, and thereby perceived by it in the viſional Way. And this, it is evident, muſt be done by ſome Supplement or Appendix without us, that is grafted on to that Part thro' which this Perception comes to it; and by a ſubſtantial Union made into a *Continuum* from the Organ to the Object. And God therefore by inſtituting the viſive Fluid, as a common Supplement to all animal Eyes, has thereby at once eaſily anſwered this ſubſtantial Production of themſelves to each Individual of all the animal Tribes; and inlarged their Correſpondence to all the Parts of Nature to which their Being has relation, as pertinent Objects of Perception within a mighty Sphere; for the Fluids that are contained in the optick Nerves, or Tubes within, by which Fluids being united to it, the Soul extends its Being from itſelf; firſt to the Eye, and there meeting in the Extremity of that Confine of the animal Syſtem, the viſive, fluid Matter without, of the ſame ſpecifical Form and Nature with themſelves, and from which they were originally borrowed and taken, to make Part of the animal Syſtem; they inſtantaneouſly unite themſelves to that their parent Fund; and, as the Nature of all Fluids is, eſpecially thoſe of the ſubtle Kind, that greedily ruſh together into one, and with whom each ſlighteſt Touch of Concourſe, is immediate and preſent Union, they become confluent and conſubſtantiate, and as much one Exiſtent with the Fluids within the Eye, as thoſe Fluids are one Exiſtent with the Soul itſelf; and to all Intents and Purpoſes of Correſpondence, by Perception, are Parts *pro hac vice* of the animal Syſtem; and ſo long as they are employed, and ſo far as they are applied, they are as much and properly the Soul's own, as any of its Fluids within, or the Veſſels that they run in, are ſo; or as if the optick Tubes themſelves were continued on to the diſtant Objects perceived: For it is not their Invaſation that creates the Soul's Property to its Fluids, but the ſubſtantial Union and Continuity; and ſo far as that Continuity with its Subſtance goes, (be that Subſtance invaſated or extravaſated, makes no Difference) ſo far goes the Individual; and ſo far it is preſent; be it by Excurſion of a Part only, that is never ſo ſmall; as ſo far as the ſmalleſt Twig runs from it upward, or the ſmalleſt Fibre downward, ſo far reaches the Tree; or as that which I reach with my Fingers-end, and extended Arm, is as near and as much preſent to me, as that which touches my Trunk; and, were my Arm a Mile long, would be ſo; and if by divine Act all the Solids of my Arm were deſtroy'd, and the Fluids only preſerved from Diſſipation, tho' left naked, I ſhould touch and perceive ſtill, as far with them in that State, as when they are confined in their Veſſels: And were my optick Nerves took out, and all the organical Solids of my Eyes deſtroy'd, and it pleaſed God to preſerve the contained Fluids from being broke in upon by heterogeneous Matter, which the Nerves, *&c.* are only Caſes and Pipes to guard againſt, and prevent; I ſhould ſee as clearly without the Solids of my Eyes, as now I do with them.

The Union indeed, and the Conſubſtantiation of our optick Fluids within, with the viſive Parent Matter without, is imperfect, and our Viſion therefore ſo too, becauſe the glaſſy Coats and cryſtalline Humours of the Eye, tho' pervious enough for Communion between our Fluids within, and thoſe without to do our Buſineſs, yet it is broken and interrupted ſtill, as the Solids of the Eye are a Partition and Boundary of the animal Syſtem; and ſo much Room as they take up, ſo far they break the Continuity. For ſo far as the Coats of the Eye are diſcontinuous, ſo far only we perceive thro' them; and ſo far as they are imporous, ſo far we are dark and blind.

So that one End of the viſive Syſtem terminates in the Soul of each Animal, in which it is rooted, and to which it is hypoſtatically united; and running continuedly from that little Angle within into the grand Ocean of the ſame viſive Matter without, 'tis thereby, at the ſame time, both Part of that, and alſo Part of each animal Syſtem; and whatever I touch and am preſent to, with Part of what is Part of me, and one and the ſame with me, I as truly and really touch, as if it were immediately united to my Soul: And whatever viſible Part of Nature therefore, is touched by the long Pole of the viſive Syſtem directed againſt it, and ſtretched from me, to it, I perceive by the ſame Means of immediate Contact, that I do any proper Object of any of my domeſtick Senſes, that is contiguous to my Body, and affects my Fluids by any other Nerves, thro' my interpoſed

Skin: Nay, my Preſence to, and Contact of the remoteſt Objects by the Eye, is more proper and perfect, than that by any other Mode of Senſe, and the Perception therefore is more clear and evident; for by my other Senſes, I perceive Objects, by Contiguity only, or outward Approximation or Nextneſs to my Body, and this too not immediately, but thro' ſomething groſs and ſtupid, and breaking the Continuity; as thro', for Inſtance, a callous Skin ſpread between: As thro' a Glove of Nature's making. And the Perception is therefore obſcure, becauſe the Preſence of the Object is imperfect, and as thro' an Intercloſe, where I, on one Side of it, do perceive ſomething that is on t'other: But thro' my Eye, my naked Fluids run Home to the Object; juſt as if, without any Skin between, the Ends of my naked Nerves uncloſed were immediately to touch Things. The more immediate the real Preſence of Objects is to us, the more clear and perfect is our Perception of them; and this makes Viſion to be more evident than any of our other Forms of Perception, and more Differences perceived by it, becauſe its Objects tho' thought to be fartheſt from us, are ſtill moſt indiſtant, and we reach them by ſubſtantial Continuities; others, by Contiguities only, or by outward Touch, without any ſubſtantial Connection; tho' we make a ſhift to graft Contiguity upon Contiguity; as when with the End of a Stick, or ſomething in my Hand, I ſay I touch a Body, by the Stick's touching my Glove that touches my Skin, that touches the Fluids of my Nerves terminating in it.

And here again we miſlead ourſelves by Terms of Speech founded on vulgar Error; and whilſt we are ſenſible that our Notices of Objects are wrought by Preſence and Contact, yet at the ſame time we keep up Notions of vaſt local Diſtances between us and them, whilſt we perceive them; and, to add to the Misfortune, becauſe it is found impoſſible really to perceive Objects unleſs they are really preſent, our Philoſophers have therefore, given up all Perception of Nature's Originals for us, and have left us no immediate Correſpondence at all, (I do not mean with Matter itſelf, or with Subſtance, for we are not admitted ſo far within the Veil; but not) even with Forms and Motion, and thoſe poor accidental Appearances, that are our only and proper Acquaintance; and tho' the Originals themſelves are but empty and fantaſtical, yet to make them more ſo to us, and to remove our Perceptions farther ſtill from Truth and Reality, we muſt not really and immediately perceive even theſe poor Shadows of Objects; but theſe muſt be made ſecond-hand Ware, when preſented to the Soul: Thus it muſt not be the real Sun itſelf that I perceive; but it muſt be, forſooth, his Idea only in me, or a Copy of his Countenance, or Picture ſtruck on I know not what, and conveyed down from him to me, I know not how. And it were ſomething tolerable indeed, to have Recourſe to this modiſh Invention of Ideas, and to have the Senſation of Objects wrought in us by their Mediation, and fantaſtical Preſentation of themſelves inſtead of their Originals, where the Prejudice of ſuppoſed Diſtance of the Originals from us prevails; there being then no other Way left for it. But why muſt we be reduced to *Ideas*, where the Originals themſelves are immediately preſent? Or, Why ſhould Nature put herſelf to the Trouble of ſtamping Copies, and tranſacting the Senſation of thoſe Objects by them, whoſe Originals are preſent in Place? But abſent or preſent, is all one, and we muſt not only hear, and ſee nothing but Ideas only, and not real Objects themſelves, but nothing is ſo cloſely united to our Organs, that is to ſay, to Ourſelves, that we are allowed to perceive, but by theſe Go-betweens, when there is no Room or Occaſion for them: We muſt ſmell, we muſt taſte, we muſt feel Ideas only of Things, and nothing muſt preſent itſelf to the Soul, but an Idea muſt be employed, and ſent in to repreſent it, not otherwiſe admitted to Preſence or Audience, but by theſe modiſh Maſters of the Ceremonies.

But by the Introduction of the viſive Syſtem, the Prejudice of the Miſapprehenſion of Diſtance between us and viſible Objects, being removed, which chiefly ſupports the Neceſſity of *Ideas*, and which has raiſed the Opinion of them beyond their natural Uſe and Deſign, which is to be Remedies for Abſence only, reduces them to their juſt and natural Bounds of being ſecondary Objects, and Expedients only; and reſtores the Soul to its given-up Right of perceiving Originals, and not being entertain'd altogether with repreſentative and miniſterial Objects, but converſing with them preſent to it, at firſt hand.

The Circumſtances of Viſion ſhew the viſive Syſtem to be ſuch as has been deſcribed, and to have moreover the following Properties and Nature.

Firſt, That it is a *Fluid*, appears by its eaſy Ceſſion to all thoſe Bodies that continually interrupt and break its Continuity, without the leaſt Appearance of its Reſiſtance, and by its inſtantaneous Reſtitution of itſelf, without Scar or Chaſm, cloſing up its Breaches behind, as faſt as they are made.

Secondly, That it is incomparably ſubtle and refined, ſuch as no ſubtler Matter does inhabit, appears by its paſſing thro', and reſiding in the moſt ſubtle, cloſe, compacted, and imporous Bodies; ſuch as are Air, Water, Diamonds, Glaſs, *&c.* And it ſeems ſubtle indeed, up to the Borders of Spirituality of Nature, like what Metaphyſicians ſay of the Soul, a Subſtance of a middle Nature, placed as in the Confines between the two, and if inferior to ſpiritual, yet ſuperior to all elementary.

Thirdly, Its Immenſity demonſtrates itſelf by its Reach from the Eye to the Fixed Stars; and 'tis not unlikely, the common *Medium* of angelical Correſpondence with celeſtial Bodies, as it is to us with terreſtrial and elementary, by Lengths of Ken, vaſtly exceeding thoſe by which it is ſupplemental to our Eyes. And it may not impoſſibly ſtand the laſt Conflagration, and ſerve hereafter our glorify'd Bodies and Souls in the ſame Capacity that it now does our mortal and corruptible ones; ſince the Scripture repreſents to us the Mode of our future Knowledge, by purified and more exalted Viſion: *Now we ſee as thro' a Glaſs darkly, but then Face to Face*, (1 Cor. xiii.) Which ſuits with the heightening the Degree of our Viſion, by Impediments removed without changing the Mode of Correſpondence.

Fourthly, Its Purity, Sincerity, and Simplicity of Matter, without all Compoſition, Mixture with, or Contamination by the Adheſion of the Particles of any other groſs and diſſimilar Matter to it, is argued, by its preſerving itſelf intirely delicate and untainted with the groſs Impurities that perpetually paſs thro' it, and which it inhabits in, or among; which ſhews it clear of all Communion with any other Bodies or Matter whatever: In none of which it is as a Part or Ingredient of the Conſtitution, by any natural Union or Connection, but as a foreign Reſident, that has no natural Relation to it.

Fifthly, That yet it does not penetrate or paſs thro' any elementary Subſtance, but only thro' its Pores, and between the Articles of its Principles, Coheſion and Connection, and Interſtices, is manifeſt by its abundant Interceptions; nor paſſes in ſuch Pores, farther than they are rectilinear. Which ſhows its Conſtitution to be all of rectilineary Filaments running every Way, like a Web with all the Trine Dimenſions equally expanded.

Sixthly, That notwithſtanding the ſo eaſy Ceſſion of its Particles, and their ſhifting their Poſts to give way to other Bodies, that it is yet within itſelf a firm and adamantine Conſtitution, immutably permanent, and the ſame as to the Form of its Particles Digeſtion, and the reſpective Order of its Parts to each other, a Syſtem of inviolable Tranquility within itſelf; no Violences can ruffle it, no Interruptions diſcompoſe it, or diſorder the State of its inward Serenity; nor the perpetual Solutions of its Continuity affect it ſo, as to unhinge it in any one Article of the Connection of its Particles to each other; or to cauſe any irregular Variations; and defeats Violence, and eludes it, by giving way as quickly as it can be hit, and cloſing as faſt as 'tis ſeparated, ſo as to be invulnerable.

Seventhly, That it is within itſelf a perfect *Plenum*, and continuous, having its Particles identified ſubſtantially and eſſentially, by the moſt intimate Union; and is conſequently all as one ſolid proper Atom. And therefore Motion being impreſs'd upon it, (ſo far as its Continuity is not interrupted) muſt affect it throughout, according to its Determination, but rectilinearly only; which is a farther Demonſtration of the Purity of its Nature; becauſe Motion acts thro' it to ſuch prodigious Lengths, and ſo thro' it only, in perfect Right Line; for all Obliquity and Declination of Motions from Right Line, is from Obſtruction and Violence, that turn it aſide, and force it out of its natural Way; which, in the viſive Syſtem therefore, meets with none; and ſo by the Delicacy of its Ceſſion, communicates the Effects of its Paſſion from it impreſs'd, to the greateſt Diſtance.

And, *Eighthly*, Tho' it is moſt nicely ſuſceptible of Impreſſions, and whatever exiſts in it, by ſo doing only, ſtrikes its perfect Form upon it, which Form runs thro' it, till it loſe itſelf by Interceptions of its

Continuity: Yet ſuch is the coarſe Fabrick of animal Eyes, that thoſe Forms ſo impreſſing themſelves on it, are not yet all, nor always perceived by the Soul; but the Touch is too ſoft to produce actual and notorious Viſion, unleſs the Syſtem is irritated and quickned by ſome additional Impulſe urging and exagitating it with ſome degree of Evibration or Trepidation, as well as Propulſion, beyond what is natural to it.

Now this additional Impulſe, by which it is thus invigorated and drove on againſt the Eye with Force ſufficient to make Forms impreſſing themſelves upon it to be viſible or perceivable by us; is given to it, we find by Experience, by igneous Matter only, to whoſe Nature and Form of Conſtitution its own ſeems nearly allied; propelled by the vivid and ſmart Strokes of whoſe Activity, it makes the Soul united to it, as aforeſaid, feel more clearly the Superficies of thoſe Bodies that it touches, and, as it were, rubs againſt with its Extremities, which otherwiſe too faintly and languidly affect it; and by doing ſo, make to it the *Phenomenon* of Darkneſs, or imperfect Viſion. We touch at all Times, and in the Dark, as well as the Light, the ſame Objects with our viſive Pole; but the Touch is too ſoft and delicate to make us ſenſibly feel the Figure touched, unleſs ſome foreign Activity ſpirit up and rouze the viſive Matter out of its native State of Reſt and Stagnation.

By this Hypotheſis of the viſive Syſtem, we may ſet ourſelves right in our Notions of the Eye, with Regard to its Uſe and Offices; which is not inſtituted (as is generally ſuppoſed) to let any new Matter or real Subſtance at all into us, that was not originally and fundamentally fixed there by Nature before, a ſtanding Part of the animal Frame; but is only to ſhut out, as a Defile, and to exclude Matter improper and heterogen: When we ſee, there is no real or material Thing that was without us, that is let in, which makes it to be Light to us, by its paſſing thro' the Eye into the Inſide; nor when it is dark to us, is it by Ceſſation, or a Stop put to the Influx of any luminous Material that ſhoots thro' the Eye, and makes Light to us; nor does any thing whatever, either go in or out, thro' the viſionary Pores of that curious Organ: No *Effluvia* of any kind perſpire that Way. The Texture of its Tunicks are ſo cloſe wrought, and its Humours ſo imporous, that only the Threads and Hairs of the viſive Matter are originally let and continued thro' its Pores that are ſuited and configured to it, but too ſmall to let any created Matter paſs beſide; by which fixed and ſtationary Threads reſidentiarily going thro' it as Thread thro' a Weaver's Slea. The Communication between the viſive Ocean without, and *Guttulæ* of it lodged in the little *Sinus's* of the optick Tubes within, is continued; which viſive Matter, according as it is agitated and impelled more or leſs, or not at all, by the Sun or ſome Flame, produces the different Senſations and Degrees of Light and Darkneſs to us. If the Sun, *&c.* briskly and vigorouſly actuates the viſive Fluid, it is clear and open Day to us; and we feel ourſelves more evidently preſs'd by every Form that we direct it againſt, and touch, and, as it were, rub againſt with its Extremities; and the Preſſure of incumbent Forms by exiſting in it, making Room for themſelves in its Plenitude, more ſenſibly affects us; which tho' they impreſs themſelves upon it at all times, and it at all times nicely receives, and takes off from them their Figures impreſs'd, yet for want of ſufficient Degree of Motion and Preſſure of them upon it, or of it againſt them, they are imperceptible to us. So that Viſion is neither by Emiſſion or Reception of any Thing.

The Office of the Eye to the Soul is the ſame as that of Spectacles to the Eye, and both the ſame as that of a Window to a Room; which, tho' we fanſy that it lets thro' Rays and Light, and Sun-ſhine in upon us; yet, in truth, as neither the Eye or Spectacles, does it let thro' it any thing at all, neither does any thing paſs thro' it but what is conſtitutionally lodged in it; for there is juſt as much, and the ſame Light, in the

Room at Mid-night, as there is at Mid-day; and there ſhoots in nothing at all thro' the Glaſs upon us, only the Sun more effectually preſſes, and gives a new Degree of Motion to what is reſident in the Pores of the Glaſs; for the Glaſs, tho' impervious to other Bodies, and to Air itſelf, yet gives free and open Paſſage almoſt every-where thro' its direct Pores, to the viſive Fluid, to which they are conformed; and makes no more Partition or Diſtinction between that which is on one Side or t'other of it; between that without, and that within, in the Room, then a Net hung up makes, between the Air on one Side and t'other of it; or than a Grate ſet athwart the Creek of a Pond, parts the Water within the little Bay from the Main; as we may plainly perceive by the viſive Matter continued ſo every-where thro' the Glaſs, as not to diſcover ſo much as any Interruption. The Solids of the Glaſs's Conſtitution, that paſs with us for the Whole, bear but the Proportion of the Threads of a Net, or the Wires of a Grate, to the Meaſhes, and innumerable Perforations; and a Sieve is much leſs foraminous, with regard to the Air or Water, than even a Diamond is, with reſpect to the viſive Matter. The Humours of the Eye I take to be deſign'd rather to cool the Heat of the viſive Matter in them, when too much intended, than for any viſionary Uſe.

But, 2*dly*, The Neceſſity of the viſive Syſtem, or of ſome other *Hypotheſis*, to ſolve the *Phenomena* of Light and Sight to us, may appear from the Exceptions that the preſent Doctrine is liable to, and the manifeſt Inconveniences that attend it, being eſtabliſhed on ſuch Terms to make it out, as are unbecoming the divine Wiſdom to inſtitute, and not ſuitable to that Happineſs of Contrivance with which the Laws of Nature are remarkable for executing themſelves in other Caſes, with Eaſe and *Compendium.*

The long and univerſal traditionary Prejudice, that the Sun is the proper and ſole Cauſe of Day to us, and the Parent and Fountain of Light, from whence it is derived down to us; and the old Story of his Accoutrement of Rays and Beams, that we dreſs him up in, to qualify him for being effectually ſo, and which Poets and Painters repreſent him to us ſwaggering in the midſt of, and encircled withal, as Emblems of his Glory; have ſo ſtrongly prejudiced our Imaginations, that our very Eyes ſee in favour of the Prepoſſeſſion, and help to confirm the Fiction to us by their Teſtimony, and to ſee thoſe Rays and Beams, that our Fancies are ſo filled with the Conceits of; ſo that there is hardly that Principle of Reaſon, or Object of Senſe, more without all Suſpicion of Miſtake, and that we ſeem to be more ſecure of the Truth of, than this, That we have our Light down to us from the Sun, whoſe ſtreaking and ſtreaming Rays we ſee deſcending; which paſſes ſo much for Matter of Fact, that the denying it may ſeem an Attack, not only on Reaſon, but on common Senſe; and yet, upon Scrutiny, this ſuppoſed ſelf-evident will hardly be found conſiſtent with either.

The Conceit of the Sun's Beams and Rays is much ſuch a ſolid Piece of Philoſophy, as Father *Homer*'s making an Archer of him, and ſhooting Beams like Arrows from his golden or ſilver Bow, or mounting him upon a Coach and Four; and 'tis as likely one as t'other. And all that goes at preſent ſo current, and is cultivated with ſo much Labour and Exactneſs by the Philoſophical, by pretended Demonſtrations and Experiments, (ſuch as that fine Amuſement, and curious Speculation, of computing the Celerity of theſe imaginary Meſſengers of Light, and telling us more exactly in how many Minutes and Seconds, after they are ſtarted from the Sun's Orb, they reach us, than a *New Market* Jockey, in how many his Racer can run thro' the Courſe) is Sagacity more vainly employed, than in diſcovering how many of his Lengths a Flea could jump; becauſe that had a real Subject, this none at all, but what abſurd Suppoſition gives it.

Did we not ſwallow the preſent Doctrine crude and undigeſted, without conſidering it, we muſt perceive it very unlikely and unaccountable.

What

What can be more ſtrange, and oddly contrived, than for us to have all our Light down from the Sun? For as Light is neceſſary and eſſential to the Well-being of the nobleſt, as well as greateſt Part of the animal World, and they are provided with Organs on Purpoſe to receive the Advantages and Pleaſures of it, does it look providently and well contrived, that a Commodity that is ſo continually neceſſary to animal Life, ſhould be ſuch a forreign one as not to be had within leſs than Forty hundred thouſand Miles from the Place where thoſe were to reſide, for whoſe Uſe it was made, and were to live by it? that we ſhould not be furniſhed with it, if not on the Spot where we live, yet nearer Home, and upon more eaſy and compendious Terms, than thoſe that are ſuppoſed, come to; nor to have any but what is perpetually diſpatched away to us freſh and freſh, by incredible Expeditions from Regions ſo vaſtly diſtant from us, as that of the Sun?

But Uſe takes off the Strangeneſs of Things, and Opinions eſtabliſhed by long and inveterate Prejudice, grow into Principles, and Indemonſtrables; and gives an Air of Paradox to plain and obvious Truths that contradict it.

Look thro' the Diſpoſitions of Nature, and ſee if there is any Settlement of Correſpondence like it, in any neceſſary Article of Life; and whether Productions of Animals, and the Origin of their Suſtenance, is at that wide local Diſtance from each other? Try it by any Suppoſition in any arbitrary Inſtitution, and how awkward and ill-contrived would it look, to place Beings at one End of the World, and their neceſſary Relations for Support at t'other? And we muſt think injuriouſly of the Laws of Nature, and their Inſtitutor, not to proteſt againſt ſuch a groſs Solecíſm in OEconomy. Were the Fruits, Beaſts, Fowls, *&c.* that are to feed us, not the Produce of the Earth that God has placed us upon; but were to be perpetually ſent down to us, as in St. *Peter's* Viſion from Heaven, or the Moon, would the Situation ſo diſtant between Correſpondents ſo neceſſary, look pretty? Does not the groſs Inconvenience make every one ſenſible of the Folly of ſuch Hypotheſis? As yet the admitted Doctrine of the Origin of Light to us from the Sun, is little leſs untoward, than what this amounts to.

But let it be admitted, that the Origin of Light is by Emanation from the Sun, yet the Way of executing this Hypotheſis, and of bringing it down to us, is a very extravagant and unaccountable Story.

Such as is, *Firſt*, the Degree of Celerity with which this Light is ſuppoſed to deſcend to us from the Sun; which is a conſiderable Objection to the Truth of its doing ſo; as it is *Argumentum ad hominem*, at leaſt.

For the fundamental Reaſon that has fixed the Sun for us in the Sky, and introduced the modiſh Doctrine of the Earth's Motion as the more convenient *Hypotheſis*, is the immenſe Circle which the Sun muſt run in Twenty-four Hours, ſo much ſurpaſſing the Motion of all Bodies that we are acquainted withal, or that we can conceive; for this I take to be what firſt ſet the Heads of the Philoſophical at work, to think of ſome other Way to ſhorten this ſurprizing Journey, and to bring it more within the Compaſs of our Conceptions of the Motion of Bodies; to which End, for the Good-husbandry of ſhortening the Way, and ſaving Trouble and Motion, they have contrived ſo to whirl the Earth round, without making us giddy, as to preſerve all the ſame Aſpects and Variety of Obverſations of the Planets to each other, which the Sun's Motion produced; and have done his Buſineſs for him, to the great Content of thoſe that like it; having left the Ruler of the Day nothing elſe to do, as to the Adminiſtration of that Province of his, but to ſtand ſtill and ſhine.

I own myſelf not to be yet a Convert to this prevailing *Hypotheſis*, and ſhall continue an Old-faſhioned Philoſopher, till, beſides making it appear barely poſſible, it ſhall be farther proved by ſome good Reaſons, that it ought to be ſo, and actually is ſo; for as ſeveral Things ſtick with me, ſo this amongſt the reſt; that if the Sun ſtand ſtill, and the Earth did ſo too; it is certain, that the ſame Part of the Earth conſtantly turn'd towards him, tho' at this Diſtance, muſt be ſcorched up, and the whole conſumed, which its quick Rotation ſuppoſed together with its Atmoſphere, by turning continually a freſh Part to him, only prevents: But then this their Motion can only prevent this Conflagration as to themſelves; but not as to any other Parts of Nature, whoſe ſuppoſed Immobility muſt expoſe them to the like Calamity; and therefore as they only make the Atmoſphere to be involved together with the Earth in its Rotation, the more immediately ſubſolar Regions from the Skirts of the Atmoſphere up to the Sun himſelf, if both are fixed, having ſuch an immenſe Body of exalted Fire lying upon them for ſix thouſand Years together, muſt long ere this have been candent, and a Region of Fire; and, by being ſo, muſt make the Borders of the Atmoſphere itſelf, notwithſtanding the quickeſt Rotation, a boiling Ocean, beyond what the Elements, were they all Water, could be able to temper or cure; inſtead of which, ſo far as our Experience reaches, we find that towards the Borders of the Atmoſphere it is rather cooler than below; and conſequently the æthereal

Region above it, the Sun or both, muſt move, and with inconceivable Rapidity too, to anſwer that *Phenomenon* ; ſo that, if the Sun ſtands ſtill, in order to ſave the Earth and Elements from being burn'd by it, it is not enough that the Earth and the Atmoſphere only ſhould be whisked round with the greateſt Velocity, to bear ſuch a ſtanding Ocean of fierce Fire fixed over them ; but to ſecure them, one of theſe two Things muſt be farther ſuppoſed.

Either, *Firſt*, That not only the Earth and its Atmoſphere, but all the æthereal ſubſolar Regions above the Atmoſphere, are alſo engaged in their Rotation, and carried round with them with the ſame, and ſo much greater Swiftneſs ſtill, anſwerable to the Increaſe of the Circumference, which towards the Extremities fartheſt from the Centre muſt be near as great as that of the Sun himſelf, if he is ſuppoſed to move ; and ſo, to ſave the incredible Motion of one Part, they muſt ſet the Whole a going with the ſame incredible Swiftneſs, and ſo make their Hypotheſis do, with more intolerable Inconvenience, the very Thing that it is introduced to prevent.

Or, *Secondly*, If the ſubſolar Regions above the Atmoſphere are not carried round with the Earth and Atmoſphere; but they and the Sun are both fixed, then to prevent Conflagration, we muſt ſuppoſe that all above the Atmoſphere immediately from its Edges, by a ſudden and abrupt Change, becomes at once ſuch Matter as is incombuſtible and inaccenſible, ſuch as the Sun's fiery Activity has no Effect upon, nor any natural Relation to; and ſuch as no way affects the bordering Atmoſphere rolling cloſe under it; for if the fixed Æther, next to the Atmoſphere above, were acted upon by the Sun's Fire in like manner fixed above it, it muſt long ere this have been itſelf all candent, and made, by its Neighbourhood, the Atmoſphere ſo too, notwithſtanding its ſuppoſed Rotation.

But by the Sun's Moving, the Danger of all the ſubject Region's Conflagration from him is at once prevented, which the Hypotheſis of his ſtanding ſtill muſt cauſe.

But be the Truth of the Sun, or of the Earth's Moving, on whether Side it will; yet thoſe who think the incredible Velocity that is required for the Sun to run ſuch a vaſt and immenſe Circumference in Twenty-four Hours, to be a Reaſon for his ſtanding ſtill, ought to think it a much ſtronger Reaſon ſtill, againſt their Notion of Light deſcending to us from him; which by their own Computation I find they make ſhoot thro' the Diameter of the vaſt Circle continually, with a Speed near a hundred times ſwifter from him, than what they boggle at in his diurnal Motion; which Dr. *Derham*, (*Boyle*'s *Lect.* Book i.) tells us, from Sir *Iſaac Newton*'s *Opticks*, (*Lib.* ii. *p.* 3. *Propoſ.* 11.)

is 60,000 *Engliſh Miles in a Second*, and is about Seven or Eight Minutes in *coming down from him to us.* So that the Sun muſt not move, becauſe it is impoſſible, or inconceivable for him to go ſo faſt; and yet they muſt have Particles of Light and Rays continually ſent down from him, by a Motion that is a hundred times ſwifter. The vainly pretending ſo exactly to calculate the incredible Degree of Celerity with which they would have Light come down to us from the Sun, is a very ſilly Story, tho' told us by the otherwiſe great Sir *Iſaac Newton*; becauſe it is neither what their Hypotheſis requires, nor is it any way beneficial: For we ſhould be as well ſupplied with Light from the Sun, were it eight Days or Months a coming, as by its being eight Minutes only; becauſe they cannot imagine that Darkneſs is an abſolute Interruption of the Deſcent of Light from the Sun, or that Night puts any more Stop to Rays coming down from him to the Earth, than Mid-day; but there is a continual Succeſſion, and the ſame continual Fluxion of them ſtill, and a continual ſettled Stream of them from him: So that the Supply of them is the ſame, moved they never ſo ſlowly, as never ſo faſt; as if *London* was to have no Water in the *Thames*, but were to wait for that which every Morning were to come down to them from the Spring-head, then the faſter it came, the better; but the Stream being continual, the Supply is the ſame by its running two Miles an Hour, as if it ran a hundred times faſter than under the Arches of the Bridge; for we are not to ſtay every Morning for Light, till thoſe numerical Beams that were at that time coming out of the Sun, have brought it down to us; but till the Motion, whether of the Earth, or Sun, brings us under the Bottom, or Mouth of the perpetual radial Stream of it, diſcharging itſelf upon the Earth; and enlightens us with Rays, that, whether they had been eight Months or eight Minutes a coming down, what Man alive can pretend to tell? unleſs he had ſeen them ſet out, and marked them; or unleſs they apprehended that by Delay in their Paſſage they might be extinct, or loſe their illuminative Virtue before they reached us. Otherwiſe, in my Mind, Fair-and-ſoftly might be the propereſt Pace for them, to come down at leiſure, two or three Miles an Hour; if it were but for good Husbandry ſake, and to ſave the Sun the Expence of ſo much of his Subſtance, as his Rays ruſhing continually from him with ſuch Impetuoſity, as to reach us in ſo few Minutes, put him to. And our philoſophical Diſpenſers of his Subſtance ſhould conſider, that to fill the immenſe Expanſe between the Sun and us, with freſh Sets of new Rays and Light every ſeven or eight Minutes, (when once a Year might do as well) is a dangerous Prodigality, could it take place, to fill this whole viſible World two hundred times a day at leaſt, as they would have him, with luminous Matter from his Body, for ſix thouſand Years together: Let them but calculate the Expence, and tho' done with Particles ſubtilized even as far as they would have them, and they will hardly account for that fiery World not being already pretty well waſted.

And the conſtant Derivation of this Light to us from him, is ſtill made more improbable by ſeveral other natural Inconveniences that attend the Doctrine, which the Embracers of that Hypotheſis make no Proviſion againſt.

Were the Sun given up to the Management of our modiſh *Copernicans*, they would be as mad as ſo many *Phaethons*, and their philoſophical Hypotheſis of his ſtanding ſtill, would as effectually confound the World by Conflagration, as the poetical one; for it is impoſſible in Nature, that any Body or Matter whatſoever, that Fire can act upon, ſtanding ſtill, ſhould bear ſuch a fiery World as the Sun is, ſtanding alſo ſtill in its Neighbourhood: for, ſtood but the Sun ſtill one Minute, I cannot ſee but it muſt ſet all the circumambient Æther, and whatever Matter is immediately adjoining to him, on Fire, and deſtroy and *diſſolve* its Form; but by his never having the very ſame Parts of it next to him but once a Year, and paſſing over them when they are ſo, with an incredible Rapidity, and inſtantaneouſly, only touching them with a Swiftneſs beyond Thought, and his diurnal Motion gradually drawing off from them, by that Time he as gradually returns, they are cooled and returned to their native Temperature again at the Year's End, and each has reſumed its proper Qualities, and is prepared to receive the like Viſit. And I take the Miracle of the Sun's ſtanding ſtill for a whole Day at *Joſhua*'s Command, to have been attended with another Miracle no leſs; that whatever was circumjacent to him, was not conſumed; and the World itſelf not being all on fire by that Stay, which nothing could prevent, but either God's ſuſpending, at the ſame Time, the natural Force of the Planet's fiery Activity during the Stoppage; or, by making what was round him Proof againſt Fire, and deſtroying its natural Relation to Fire, as in the Caſe of *Shadrach*, *Meſhech* and *Abednego*: For there needs nothing more to bring on the laſt Conflagration, to *melt the Elements with fervent Heat, and to burn up the Earth and the Works that are therein*, than to execute the *Copernican* Hypotheſis upon us, and ſtop the Sun; and the Work would, almoſt in the Twinkling of an Eye, be done.

If Light is derived to us by the ſubſtantial Emanation of ſolar Particles, and real Effuſion of luminous Matter perpetually ſtreaming out from him, ſuch as are imaginary Beams, and Rays iſſuing out of his Body, and from ſo far ejaculated to us;

this makes the Sun to be a mutable and corruptible Body, which is an incredible Story in itſelf; and to give the Notion Credit, Care ſhould be taken to vindicate the Scheme, and clear it from manifeſt Objection, to give ſome Account, and propoſe ſome Method for an anſwerable Supply, by Reſources brought in View; how ſuch a prodigious Waſte and Conſumption of the ſolar Subſtance may be ſupplied, and whence freſh Materials may be drawn out to fill up the Vacancies made by ſuch prodigal Effluxions as are continually diſcharged from the Sun's Body; by telling us, that either by ſome ſecret Circulation, the igneous Matter that goes off in Rays, comes round again to the Planet, the Ocean of Fire, as Water does to the Sea, by ſome Change of Tendency, ſo that he is continually gaining what he is continually loſing.

And indeed, could they make it appear by what Violence it is darted down to us, and made to fly from its natural Seat and Centre, contrary to the natural Motion of all Fire, which flies from us upwards towards him, we might more eaſily believe its reſuming its natural Form of Determination, and finding its Way back again to its Source and Original; or as a Stone's Deſcent, that after it is no longer forced upwards, returns of itſelf by the *Hocus-pocus* of *Attraction* or *Gravitation* (two natural Abſurdities as great as Tranſubſtantiation) again to its Centre the Earth; ſo the Sun itſelf, ſhooting his Rays violently downward, receives them in like manner back again of themſelves, when the Force that ſhot them out will carry them no farther, did not his continually ſhooting of more ſtill downward, make it impoſſible for them to execute ſuch their natural Inclination, if they had it, to go back again that Way, being ſo continually pelted downward ſtill, by their Succeſſors: Or, that his Rays are fixed in him, like Prickles in the Porcupines, as he is drawn upon Sign-poſts, and that he wears them always the ſame down to the Ground, as a Comet does his Bruſh Beard or Tail, whence he was called *(intonſus*, &c.) *unſhaved, long-hair'd*, by the Poets: Or as Fire naturally turns what's next to it, into its own Form and Nature, ſo the Sun, by his ſuperior Activity, perpetually converts the neighbouring *Æther* into his own Form, which ſucceſſively flows in upon him, as faſt as his Evaporations, to ſerve our lower World with Light, make Room for it; which Evaporations again, by gradual Exaltation, reſume their Form; and ſo come round into their forſaken Places again.

If they admit of the Sun's Waſte and Evacuation by Rays, or any thing elſe going off from his Body, they ought by ſome ſuch Means or other to make good the Damage, and account for his Repair; otherwiſe they leave him in a manifeſt galloping Conſumption; which muſt pine him away, were he ten times bigger than he is; for the Doctrine of enlightning us by Rays, or *Effluvia* from him, as it puts the Sun's Body on the ſame Foot with that of our common Fire, ſo it makes a Supply of Fuel equal to its Evaporations, as neceſſary to keep it from Decay. And when we conſider what a prodigious Effuſion of luminous Matter is perpetually going off from him; what Oceans of it there muſt be to fill ſtill, not only half our lower World, but the intermediate Expanſe between us, but what the Interpoſition of the Earth intercepts, with a perfect Plenitude of it, Regions ſo many Millions of times bigger than himſelf; and that he does not this by particular Mouths, and diſtinct Chanels only; but, as guſhing continually every Way at once, from every Part of his patent and open Orb, by a total Diffluence, as from a Sea unconfin'd by Shore: and if we ſuppoſe a Tendency in any Part of his Subſtance to fly off from him, it is impoſſible to conceive what ſhould keep back the reſt at Home, or prevent it from flying all Abroad at once: For with what Fences ſhould we circumſcribe, and pretend to keep together ſuch an immenſe Body of ſuch Fire againſt its Inclination? Were it ſo, it is impoſſible but his Orb muſt have been exhauſted and evacuate, and left an empty Hoop before this Time. If the ſolar Subſtance ſtole gently off from his Orb in Rays, and were exhaled and breathed out, like what is perſpired by Bodies thro' their Pores; and the Tendency of Sun-beams downwards were like that of Vapours from our terraqueous Globe upwards, contrary to their natural Inclination, ſo as to return back of themſelves, when the Cauſe that drew them unwillingly up from it ceaſes, the Sun might not ſuffer much by the Expence of Emiſſion: But when they make his Beams ruſh down from him with a Violence a hundred times greater than that which acts a Cannon Ball diſploded, or than Oceans of Fire by Eruptions from *Mount Ætna*; this being perpetual, argues a violent Inclination in the Subſtance naturally to fly off and break away from its Orb; inſtead of a powerful collective Principle to keep it together, to prevent Diffluence and Diſperſion from its Centre. But the Beams breaking out from the Planet with ſuch Fury, and deſcending with ſuch Precipitancy as from Reſtraint and Detention, ſhews a native Tendency in them to fly all Abroad; which what could prevent, were they ſo inclin'd? As 'tis no leſs impoſſible to conceive, as 'tis otherwiſe, which way Nature ſhould anſwer ſuch a prodigious Expence. We find indeed that a little Piece of Matter may be ſo ſubtiliz'd and rarefy'd, that from taking up a little Room, it will fill a Sphere of vaſt Circumference with its Evaporations, for a good while; and yet ſeem not much leſſen'd, as we find by Fumes and Smells: But as this, alas! bears no Proportion to the whole viſible Univerſe being conſtantly filled now for Six thouſand Years together by Effluxes from ſuch a comparative Speck as the Sun ; ſo, if that could be, yet the Parallel would by no Means hold good, either as to Cauſe or Conſequence; whatever Bodies ſend out *Effluvia*, it is certain, are waſted, and made leſs by it, however inſenſibly it may be, unleſs they have a ſecret Supply anſwerable to what is ſent Abroad ; which muſt not be admitted of the Sun: And what makes Bodies fill larger Spheres with their effluvial Particles going off from them, is the Comminution, the Sublety, and Activity of thoſe Particles, beyond what they had in their State of Union to their Body. But this cannot be a Reaſon for the Matter of which the Sun is made up, poſſeſſing by Circumfuſion a larger Sphere by its Particles that fly off, than they did in his Orb. For we cannot think that the ſolar Subſtance is capable of farther Refinement, either by Rarefaction or Increaſe of Activity ; or that the Particles in the Body of the Orb, are more groſs than thoſe that go off in Beams, or more condenſed ; but muſt be rather purer and ſubtler in their Fountain and Original, than in its Streams below.

Nothing is more ridiculous, than that Theorem, (*Graveſand*, Book i.) " That any " Particle of Matter, how ſmall ſoever, and " any finite Space, how large ſoever, being " given, it is poſſible that that ſmall Sand

" or Particle of Matter ſhall be diffuſed " thro' all that great Space, and ſhall fill " it in ſuch a manner, that there ſhall be no " Pore in it, that ſhall exceed a given Line." As alſo their Doctrine of the Subtlety and infinite Diviſibility of Matter, with their Inequalities of Infinites; (which divine Attribute is made very cheap with our modern Philoſophers) which the aforeſaid Theorem is deduced from ; to wit, That *each Grain of Sand muſt have an infinite Number of Parts, infinitely ſmall.* At this Rate, the ſmalleſt Parts of any Bodies conſiſt of as many Parts as the greateſt, or the *Totums* ; and every Particle, tho' infinitely ſmall, is ſtill infinitely great, being ſtill infinitely diviſible. What a needleſs Creation of ſuperfluous Lumber is the whole Bulk of Matter, if one the leaſt Particle of any Part of it, would as well and completely have filled the whole immenſe Space that its Univerſe poſſeſſes? Or what need of all this broad-faced Sun to fill the World with Light, with his Subſtance, when but one ſingle Particle of but one ſingle Ray of his, divided as it may be, would fill the whole Hemiſphere as nicely, *ſo that there ſhall be no Pore in it, that ſhall exceed a given Line? Quorſum hæc perditio?* What can be weaker than to imagine, that any the ſame Matter ſhould take up more Room, or fill a greater Space ; and more cloſely, when it is divided into Parts, than when it was whole? How trifling are ſuch

Inſtances of this, as that of a ſilken Thread Three hundred Yards long, weighing but two Grains and a half, to the Stretch of their imaginary ſolar Rays from Heaven to Earth? Or what *if a Grain of Leaf-gold cover Fifty Square Inches?* Or what *if Eight Grains of Gold will gild Silver Wire that is Thirteen thouſand Foot long*, &c. What is all this, compared to the Sun's gilding the whole Expanſe of the Hemiſphere, not once with the ſame Beams, but continually with new ones inſtantaneouſly ſucceeding each other? How many Grains of Gold would it coſt to new-gild the ſame Thread only over-again, and cover the Fifty Inches ſquare, Sixty thouſand times a Minute, for Six thouſand Years together? For that is the Way to calculate the Expence of ſolar Subſtance filling the Hemiſphere with emitted Beams continually ſince the World's Beginning. To which what Subtlety of Particles can be ſo ſufficient, but that the Sun's Body, by the Conſtancy and long Continuance of the Expence, muſt by this time have had his Orb ſhrunk conſiderably, tho' all the Particles employ'd at once, were but half a Grain?

As the Sun, by Six thouſand Years Experience, has ſufficiently approved his Indefectibility and Incorruptibility to us; ſo we muſt conclude, to make him anſwer this Character, That his Body and Subſtance is as fixed as his Courſe is, if he moves; or as his Station, if he ſtands ſtill; and that the ſame he was when he was created, the ſame he always has been ſince, and is ſtill without the Alteration of ſo much as one ſingle Particle in him; or the Change of one Atom, or its Place in his Conſtitution, without any of his original Materials going off from him, or being wore out, or any thing new took in, to mend or repair his Decays. He is not a flux Body, like our elementary Conſtitutions, that grow and decay, and are the Effects of Generation, and are not one Moment made up of the ſame numerical Particles; but the Sun being made *that* in Perfection, which Motion can work up Matter to, can be ſubject to no farther Change of Form from himſelf, or from any other Bodies, that he is inſtituted to be the Cauſe of to the Elements; and as his Matter is naturally incapable of higher Exaltation, ſo there is nothing to work its Degeneracy. We ought not only to think that the Sun's Orb is exempt from Change by Ingreſs or Egreſs of Matter, but as to his inward Form alſo, that the reſpective Site of its Parts and Particles to each other is immutably fixed, as much as if it were all but one ſolid vivid Atom; it is not made up of a tumultuary Agitation of Particles like our common Flame, promiſcuouſly dancing the Hayes amongſt themſelves, like a Cloud of ſmall Flies, or Duſt; but each of its Particles are more immoveably fixed than thoſe of the Solids of a

Diamond. And all thoſe aſtronomical Fancies about *Maculæ* in his Face, coming and wearing off again, which ſuppoſe the Luminary to be ſubject to Diſorders, and like foul Liquor by Fermentation purging itſelf, by working out from within Droſs and Scum upon its Surface, are inconſiſtent with his Incorruptibility and Immutability, and are founded on the Conceit of preſumed Analogy of the little Patterns of elementary Bodies with us, and their Conſtitutions, to thoſe above, whoſe created Perfection ſubjects them to none of thoſe Accidents of Motion, by which Changes are wrought in mix'd and ſublunary Bodies. We may as well ſuppoſe, that he wants to be skimmed like a Pot, or ſnuffed like a Candle, as to have any ſuch ejected Feculency on his Surface. And whatever Appearances of Spots or Maculations the Far-ſighted may diſcover by their Teleſcopes, muſt be ſome accidental Interceptions by ſomething interpoſed, that in the manner of Eclipſe, or Cloud, may dim him as to us here and there, but many a fair Mile below him, and not in the Luminary itſelf: Something may be interpoſed between us and the Sun, but that this Something muſt be a Fedity that is ſtarted up in his Subſtance, that masks his Face, or marks him with Blotches breaking out from his Body, is the moſt unlikely of Cauſes: And we ſhould rather ſuſpect it to be any-where elſe, than fix ſo abſurd a Suſpicion and Indignity on him; de-

detracting from his natural Purity, and Perfection of his Matter and Form; and we may as ſoon believe, that the Evening or Morning Sky is changed from Blue to Red, by Alteration in its Superficies; when the Sun tinctures interpoſed Vapours, that hide its native Colour from us; or that the Sun himſelf looking Morning or Evening pale or red, owes that his Change of Complection to his being ill affected within, as that Eye of the World to be ſubject to Cataracts, and contracts new Blemiſhes; but Travellers thro' the Sky, like thoſe thro' the Earth, muſt be allowed to be large in their Reports, and equally indulgent to their Imaginations, as well to fanſy, as frame, whatever may magnify their Viſion by ſurprizing and aſtoniſhing others; and Mankind's Fondneſs for the marvellous gives Encouragement to the Vanity of ſuch Attempters.

But, 2*dly*, Let it be granted, that we are enlightned by real Effuſions from the Sun; yet, what ſhall we think becomes of ſo much celeſtial Matter as has now for Six thouſand Years been conſtantly ſtreaming down upon us, the pureſt and moſt refined of the whole Creation, that with ſuch immenſe Profuſion from the Sun only, beſides what proceeds from the innumerable Stars, fills not only our ſublunary World, but all the ſuperior Regions alſo continually? That is enough, were it real Subſtance, to exhauſt them, and empty the æthereal Regions of it, and tranſlate Heaven to Earth. What Diſpoſitions are made, or can be made, for ſuch Oceans of luminous Material as are ſtill flowing down to us? What ſhall we ſay becomes of all our old Sun-beams, when the new ones are continually coming into their Places? or where find a Repoſitory fit, and of Capacity ſufficient for a Lumber-room to hold all this uſeleſs and tarniſhed Gold? Muſt we think them inſtantaneouſly annihilate, and having performed their momentary Office of enlightening us, to vaniſh out of Being? or to be turned into ſomething elſe, and, like Flaſhes of Lightning, preſently extinguiſhed, and loſing their igneous and luminary Nature, to be changed into Matter of ſome coarſer Form, like Particles that conſtitute our Flames, that as faſt as they go off from the main Body, loſe with their Activity, their fiery Quality, and fall into common Earth and Rubbiſh, and having acted the Part of Fire, vaniſh into *Caput mortuum*, as faſt as they are made ſo, and relapſe into their former Nature of Earth or Air? Were they turn'd into any thing elſe, it muſt cauſe a diſproportion'd Excreſcence or Increaſe of that elementary Matter ſomewhere or other that they are turned into, unleſs by as perpetual an Advancement of groſſer Matter into ſolar Form, it is prevented, and celeſtial and elementary Subſtance, by a Viciſſitude of Tranſformations, took each other's Place and Natures. But I do not find that any Care at all is taken by theſe, or any other propoſed Methods, to clear the **Hypotheſis** from Objections; but we go on in the old Way, believing Sun-beams, and ſo long as we have them but, and our Turn is ſerved with them, we take no farther Care about the Matter, nor trouble our Heads how we came by them, or what becomes of them; but making Nature throw them down among us with a moſt prodigal Squander of the precious Materials, where they happen to fall, there they may lie for us; nobody ſo much as wondering that we are not already over Shoes in ſecond-hand Light, and faded Colours; and that ſo much Matter of celeſtial Original, that not eight Minutes before ſhone in exalted Station, Part of the top-Glory of the viſible World, dazling human Eyes, falling as Lightning, like *Lucifer* from Heaven to the Ground, is daily, continually trampled under Foot amongſt the Mire and Duſt: or, that the intermediate Regions between us and Heaven, if they are volatile, and not ſo ponderous as to fall quite to the Ground, or lie there, are not more ſtuffed and ſuffocated with them, than we find they are, which ſeems pretty unaccountable, if the preſent Doctrine of the Derivation of Light to us by Fluxion of Beams from the Sun were true. We think as childiſhly as the Wanton that acts the Farce; to believe that it is any real Light, or ſubſtantial Rays, that with his Jack-a-lant, or Bit of Glaſs, a Boy throws here and there for Sport, and toſſes up and down with ſuch inimitable

Swiftneſs: Or that Particles of the Matter of the moſt glorious Syſtem in the World, derived from Heaven, and intercepted in their Deſcent, and diverted from their deſtin'd Road, after ſo long a Journey down, in the very Article of their Arrival, are welcom'd with being made to dance ſuch vain Vagaries, and to be bandied and ſpatter'd about by Reflexions and Refractions, wildly flying here and there, and ſent Fools Errands by the Turn of each Trifler's Thumb: Or, that what paſs for Reflexions and Refractions of Light, are produced by breaking the Courſe of any real Rays or Matter whatever, that is derived to us from the Sun's Body. It is not any real Thing, but Motion only migrating from Line to Line, and the Preſſure of the Sun upon the Syſtem of Light, diverted from its Courſe, and taking new Directions from the Pores of the Glaſs, whoſe Tranſitions and Derivations of itſelf from Lines of one Tendency into thoſe of another, that plays thoſe Gambols, and acts thoſe Skip-jack Appearances that paſs for Refractions and Reflections of Sun-beams, by which nothing is really moved or diſplaced, not one Thread of the Syſtem of Light, or any of its Texture broken, nor one Principle diſlocated; but all that is real and ſubſtantial in Nature, both Matter and Form, ſtand juſt as they did, and where they did, ſerene and unruffled, as, upon the removing the Cauſe, we find they inſtantaneouſly are.

As Flames that we raiſe from Combuſtibles, and the Fire that we give that Form and Activity to, from Matter forced into it, have the ſame Properties, Effects and Virtues, as producing Light, Heat, Colours, that the Sun has; ſo from thence we may conclude, that that is alſo Fire and Flame, and that they both are Matter of the ſame eſſential Form; and that the Difference between them is like that between Individuals of the ſame Species, and lies in Degrees, and Circumſtantials; as that the Sun is of nobler, original, native Fire, made ſo by the Creator himſelf immediately; its Matter of greater Purity, and its Subſtance more excellent than elementary: Ours raiſed from meaner Matter and Form, as made ſo by Exaltation, and being wrought up by Violence from coarſe Materials, and low Original, into fiery Form and Activity; which Materials therefore cannot maintain themſelves a Moment in their aſſumed State of fiery Dignity and Sublimation; which, as faſt as they attain to, they loſe again; for our factitious Flames laſt no longer than new Particles prepared are perpetually ſuggeſted from the parent Fund, and conſiſts by a continual Succeſſion and perpetual Renovation by freſh Fewel; is not a fixed State of Exiſtence, but a Tranſition of Matter out of one Form into another; and in the critical Article only of its Paſſage, is Fire, which it is no ſooner made, but it is unmade again: Whilſt the Sun is native Fire, Igneity is its original created Form, not aſſumed by Converſion from any other Fire cauſal, and not the Effect of any natural Cauſe; ſo not ſubject to any Change of Form, either from his own Activity, or that of any thing elſe without him, being incapable of farther Exaltation, and as incapable of Degeneracy.

The Sun therefore, and our common Fire, being of the ſame Nature, and producing the ſame Effects, and affording the ſame Uſes to us, of enlightening and warming us, we have no Reaſon to think but that they both muſt do it by the ſame natural Means and Method; now 'tis evident that our procreated Fire and Flame does not enlighten by any *Effluvia* or Evaporations whatſoever; nor by the Emiſſion of any Matter ſtreaming from it like Rays from the Sun, nor by the Waſte and Conſumption of its Subſtance: For Flame itſelf, and all effluvial Evaporation from Fire, tends chiefly, if not only, upwards, unleſs by Violence diverted and otherwiſe determin'd; and if it enlighten'd us by any Effluxions, as thoſe Effluxions would not be equally diſtributed every way from it, nor conſequently the Light; ſo a Candle, *&c.* would give a much greater Light upwards to thoſe above it, than horizontally; and little or none, when placed on high to thoſe beneath it, none of its *Effluvia* tending downwards; which does not anſwer in Experience; nor can it be reaſonably ſuppoſed, that a Light-houſe or a Beacon ſhould illuminate a Sphere of ſeveral Miles Circumference, ſo inſtantaneouſly as it does, by any Rarefaction or Subtilization of its own proper Matter ſent Abroad: Or, that a Lamp ſhould ſo extemporarily fill at once with luminous Matter ſo great a Circle round it by its *Effluvia.* Who can think that the Light that a Candle gives, is only Particles of flying Greaſe, that fills ſo perfectly the Room at once, ſhot thro' its horny or glaſſy Incloſure? Or that what is waſted and conſumed of its Subſtance, either goes off ſplendent and radiant from the Magazine, or continues ſo in independent State, till it reaches our Eyes, and affects them with Viſion? And that Colonies of fiery Particles perpetually ſent out from the little Metropolis Flame, are what fill the Air round from itſelf to ſo great a Diſtance with luminous Matter? Which were it ſo, it could not ſo ſuddenly loſe its enlightning Quality again; but we ſhould ſee by it ſome Moments after, the Flame that ſent it out was hid or extinct; and their enlightning Quality and Nature would gradually go off, and not at once, as it does.

It is plain, that it is the ſtanding Body of Flame itſelf only, and not any Fluxions or Derivations from it, that act without the Bounds of its proper Superficies; and that it is the little Space only that it actually poſſeſſes, that does the whole Work of Illumination;

mination; by acting upon ſome conſtantly fixed and ſtanding Body of Matter, circumfuſed, and incloſing it; and by briskly touching and propelling from itſelf the Threads of the viſive Syſtem continued from our Eyes to it, by making us feel its Preſſure upon us, affects us with the Paſſion of Viſion; and why ſhould we think ourſelves illuminated any more by Rays from the Sun, than from a Candle? which to us is a little artificial Sun, a little occaſional Vicar ſet up to ſupply his Office in a meaner and diminutive Manner and Degree. The Sun's purer Subſtance from his vaſt Orb produces the *Phenomena* of Light in greater Perfection, and fills with it a Hemiſphere ſuitable to his Grandeur, Magnificence, and ſuperior Activity, worthy the Hand of the divine Architect, who himſelf immediately made, and fixed him in his high Station; whilſt we poor Worms are indulged with humble Imitation to light up our trifling Copies of the mighty Original, by Expedient ſuitable to our little Capacities and Dimenſions.

Avoiding theſe therefore, and other natural Difficulties, Inconveniences, and Abſurdities, without the Sun's enlightning us by the needleſs Expence of any Part of his Subſtance; without perpetually blending Heaven and Earth, or any incredible Expeditions of Beams or Light ſent down to us from their native Sky; without making thoſe Rays over-ſhoot their Journey as far as the

Moon, only thence with inconceivable Rebounds to jump back again upon us to the Earth; without torturing Rays and Light by artificial Refractions by Priſms, *&c.* enough to breed the utmoſt Confuſion amongſt them, were they what they are ſuppoſed to be, letting the Sun be the ſame Sun now, as to each numerical Particle that he conſiſted of, the Minute that God firſt made him; without diſordering any the leaſt Part of Nature by Change of Place, or of Site; is it not more reaſonable to think the whole Buſineſs and Operation of Illumination and Light, to be wrought by the eaſy and compendious Inſtitution of the viſive Syſtem, and that Light is always equally preſent to us all? Which Syſtem, whilſt riding thro' with a Speed which the Frailty of our elementary World cannot, without Deſtruction, bear any Remiſſion or Abatement of, and which is not more wonderful than the Immenſity itſelf of the Circuit appointed him to run, the Sun actuates and invigorates with Motion; he thereby makes it Light and Day to us; and, in Concert with the Moon and Stars, with inimitable Meaſures, makes the Diſtinctions of Time, and the Revolutions of Seaſons.

It is by this aſtoniſhing Syſtem, whoſe very Being, to the Reproach of Philoſophy, is a Paradox to it, that all the *Phenomena* of Viſion are produced; by a little Change only of Motion in this conſtant and ſtanding Part of Nature, the Diſtinction of Light and Colours, and all their ſurpriſing *Phenomena*, by a ſhort, clear and eaſy manner are made to us; without Emiſſions or Receptions of any thing by the Eye, by a little Variation of Motion only: And the ſame ſuppoſed Rays, that enlighten the ſeveral Parts of the Earth to Day, enlighten'd thoſe ſame Parts Yeſterday, and from the Beginning of the World, and will do ſo to the End of it unmoved and unchanged; the ſame mighty Inſtrument kept ſtill ſtrung, and the ſame numerical Threads and Wires of it fix'd in the ſame Places and Order, are what the Sun flying over, plays over-again upon them the ſame harmonious Tune of Light and Heat to the Earth, by the Return of the ſame agitating Cauſe above to the ſame Station and Point, without any thing new: It is this Syſtem that is that true Harp of *Apollo*, hinted at by the Ancients, to which the Sun ſerves only for a *Plectrum*, and is as the Fiddle-ſtick to the mighty Inſtrument, that by touching over and over the ſame Strings ſuitably to the Temper of animal Eyes, actuates it with thoſe Evibrations that produce the agreeable Senſations of Light and Heat, and inſpires alſo the Elements with all their genial Activities.

But we are ſo taken up with the Sun, and with our Eyes, and our Contemplations of the *Phenomenon* of Viſion; are ſo wholly engroſs'd by them from Prejudice, as its principal Cauſes; that the viſive Syſtem, whoſe Virtues are the chief Subject of Wonder and Admiration, lies neglected and unthought of, to which the Sun himſelf, bright as he ſeems, yet is ſo far from letting us ſee other Things, that he owes not only his own illuſtrious and glorious Complection, but his Viſibility, to it; without which he would roll over our Heads, and all the Stars along with him, a dark and imperceptible Ball of black Fire, undiſtinguiſhed by us, unleſs as the unknown Cauſe of Heat. And for our Eyes, alas! what are they, and how low a Part do they act in the Production of Light to us? Notwithſtanding their curious Form, and nice Structure, they are but a Pair of living Spectacles at laſt, naturally growing on and ſubſtantially fixed to the Soul, as the other are more clumſily to the Noſe; and are to the Soul, what Spectacles are to them, only more curiouſly contrived; but their Office in Viſion, and the Share in the Operation, is the ſame; which is to ſerve as Streiners, as by Filtration and Tranſcolation, to give free Paſſage and Conduct to the Threads of the viſive Fluid, and to keep back and ſhut out every thing beſide; ſo that the Communication between the viſive Fluid without the Eye, and that within it, in the Optick Nerve, may not be interrupted by Solution of its Continuity, but that Forms touched by it, and impreſſing themſelves on it without, directed and conducted thro' it with Clearneſs and Diſtinction of Touch, may be felt within.

I conclude therefore, that the preſent Fundamentals of our Opticks are intirely falſe; that Light, and Sight, and Colours, are not produced to us by any new Matter from the Sun, but by a new Motion only given to the ſame Materials, ſtanding in the ſame Form; and our great Sir *Iſaac Newton* ſinks ſtrangely below his Character, in pretending by Experiments and Demonſtration, to diſcover fundamental Colours to us as real Things, and Objects materially exiſting without us; and Light as deſcending to us from the Sun, and to meaſure the Degrees of Celerity by which it comes down; which is all vain and abſurd Imagination: For, *firſt*, we can no more hear or ſee what is at a Diſtance from us, than we can taſte or ſmell what is ſo: Which is, at no Diſtance at all. And as at the ſame Inſtant that I touch, I feel the Thing touched; ſo at the ſame Time, and for the ſame Reaſon that an Object that I call a great way off, touches me thro' the Eye, I ſee it; and, in neither Caſe, is there any Room of Time or Place for ſucceſſive Motion from the Object to me. And as for Light itſelf, it is no Object of Perception at all, but is the Subject of it only; it is not that which we ſee, or which is ſeen and perceived by us, but it is that which ſees, or which we perceive and ſee other Things withal; and is occaſionally, and whilſt we ſee, an organical Part of us, as much as any Part of our Bodies are ſo: And tho' it be a real ſubſtantial Something without us, exiſting dictinct from ourſelves; yet it is from our ſhutting it out, and occaſional Uſe, and by wanting it, that we find it to be ſo, not by our having it; for whilſt, and ſo far as we actually uſe it, it is ſo far annex'd and hypoſtatically united to us: And we no more ſee it, than we do our Optick Fluids within us. It is the Object only that terminates and ſtops it, and preſſes back the End of it, that we perceive, and not the pretended Pole itſelf with which we reach it, which is inviſible; for it is the Boundary only of our Sight that we perceive, and not the intermediate Light, which only diſcovers that Boundary to us. And were there no Bounds put to Light, we ſhould ſee nothing at all, becauſe there would be nothing to be ſeen; any more than we can hear, when there are no Sounds; or taſte and ſmell, when there is nothing to be ſmell'd or taſted. For it is that which reſiſts only, and puſhes back the viſive Fluid upon us, that we ſee; and Light itſelf, were it boundleſs, would be as Darkneſs to us; for it is not as Agents, but as Patients only, that we perceive; and till ſomething acts back, and turns upon us, we ſhould no more ſee with our Eyes than we feel with our Hands groping, till ſomething oppoſes itſelf to them. And for Colours, they are but the Affections of our viſive Perception, the Manner of perceiving wrought in us variouſly, according to the various Touch of the Superficies of the perceived Object. And Sir *Iſaac* might as well have pretended to hear Colours, as to ſee them as Realities without us.

I ſhould now proceed to try ſome of the *Phenomena* of Viſion, by my Hypotheſis of the viſive Syſtem, and ſhew how eaſily and naturally they ſolve themſelves, and may be accounted for by it, without any Spatterings of imaginary Sun-beams by Refractions, or their rebounding back, and ſuffering Repulſe, like Balls from a Wall, or Marbles from a Pavement, by Reflections; by ſhewing that all theſe Appearances are wrought by mere Motion, which being impreſs'd on the viſive Syſtem, runs along its continuous Threads, and ſhifts itſelf off from ſome of them to others, without altering at all the State and Conſtitution of its Subject, which ſtands fixed and the very ſame, ſuffering no Tranſlation from Place to Place, by the Motion's Tranſitions from Lines of one Direction, to thoſe of another, either in Whole or in its Parts; but according to the Diſpoſition of the Pores of thoſe Bodies that it paſſes thro', is forced in upon fewer, or diſperſed into more, or quite ſtopped, and by this Means obliged to communicate itſelf to that which is charged on Lines of other Tendency there terminating, with which it runs into one, and is confluent ; and proceeds by thoſe that are anſwerable to the Angles of its Incidence : So that, tho' the Lines themſelves ſtop, yet the Motion impreſs'd upon them goes on ſtill in thoſe others which they terminate in, and into which they diſcharge the Motion. Which Motion, as it is either diſperſed into more Lines, or collected into fewer, gives thoſe Appearances that are called Refractions and Reflections of ſolar Subſtance ; as Motion is diſſipated or contracted, the leſs Compaſs, and the fewer Lines that Motion that is impreſs'd upon many, is reduced to run in, by ſo much more Light and Heat is intended in thoſe Lines ; for ſeveral Motions uniting and concentring in one, make that one to be equal to them all. Hence the Burning-glaſs has its Virtue, not by its collecting any Sun-beams, but by making that diffuſed Motion that was impreſs'd on more viſive Threads on one Side of it, in its Paſſage thro' it, communicate itſelf to fewer on t'other, by the Inclination and Convergency of the Pores that let it thro', inward and towards their Centre.

To make what I mean more intelligible, that what we call Reflections and Refractions of Light, are not wrought by any luminous Matter flying here and there ; but by Motion, only ſhifting itſelf off from Lines of the viſive Syſtem of one Tendency and Direction, to thoſe of another; without altering at all the inward Texture of that Syſtem,

or

or its Particles Change of Place or Site ; it is neceſſary, firſt, to ſet right our preſent Notions of Motion itſelf, and of its Nature ; which I take to be very falſe and imperfect.

And, *Firſt*, I think it is admitted by all, that Motion is not Matter.

And tho' we have no Inſtance or Experience of it, but as an Inexiſtent in ſome Matter ; and not as independently exiſting, and in ſeparate Eſtate, yet it is evident that it is a real Something of itſelf, that is diſtinct from, and independent on Matter and Bodies : And as Matter may be without Motion, ſo Motion may be without Matter, which it is nothing of kin to, nor has any natural Relation to, being rather a Contradiction to it, which is forced upon it, and which Matter reſiſts, as far as it can, as the violent Breaker of its ſelf-natural Reſt and Repoſe. And that it is not an Accident, appears by its migrating from Subject to Subject ; and by a proper Diviſibility of its own, diſtinct from that of its Subjects ; as when Motion that is impreſs'd upon one Body, communicates itſelf quantitatively in Parts and Proportions to ſeveral others ; or as when ariſing from ſeveral different Principles, and in different Places, it runs all into one. For we ſee that ſeveral ſmaller Motions united, make but one great one ; and one great Motion breaks itſelf into ſeveral ſmaller ones ; and it is odd indeed to rank amongſt Accidents that which has ſo great Power, and to make it an ignobler Being than Matter, that it has ſuch an abſolute Dominion over; and which is the Cauſe of all Generation and Corruption, and the Soul of the elementary World, which it actuates and enlivens; which, without it, would be a ſtupid dead Carcaſs, and inform Maſs; and as awkward Philoſophy as it would be, to think the Body to be Subſtance, and the Soul that actuates and informs it, to be its Accident only; ſuch is it to make Bodies ſubſtantial, and the Subjects of Inheſion, and Motion communicated to them, to be their Accident only; which better deſerves the Name of Subſtance, and being the Subject. And it ſeems a juſter Notion and Expreſſion, to ſay, and to think, Motion to be veſted with Matter, than Matter with Motion, which is ſo much the nobler Being of the two: As when a Bullet flies thro' the Air, it would be righter to ſay, that the Motion carries the Bullet, then the Bullet the Motion, as its Accident.

It is not a juſt Definition of Motion, that it is a *Tranſlation of Bodies from Place to Place*; for Motion runs thro' Bodies, and proſecutes its Courſe, where the Bodies 'tis impreſs'd upon, are themſelves fixed and unmoveable, and without any ſuch Tranſlation either of the whole Body, or Alteration of the Body's Conſtitution by Ceſſion of the Particles inward: As for Example, place a

Row of Marble Balls or Glaſs Beads, *&c.* touching each other, and preſs them but gently againſt a Wall, that the laſt of them touches, and the Motion that I impreſs runs thro' them, and is communicated from one of them to the other, and by the laſt to the Wall itſelf; and yet there is no Change of Place either abſolute, by Progreſs of the Whole; or relative, by any Ceſſion of their Parts inward. And it is the ſame in continuous Bodies: Set one End of a Bodkin, *&c.* againſt a Stone, and gently only preſs the other, and the Motion that you give to one End, communicates itſelf to the Stone at t'other, without any Change of Place, true or relative; tho' the Motion runs thro' it as effectually as if it were tranſlated, and every intermediate Atom of the Bodkin in the Line communicates it to the next. So that Motion tranſlating the Subject into other Places, is only accidental. Which, according to the Quality and Circumſtances of the Subject, it proſecutes its Journey either with or without doing, till it meet with Obſtacles ſufficient to waſte it by Communication of itſelf to them.

Nay, Motion not only runs thro' continuous or contiguous Bodies, without making any Change of Place in them; but, whilſt it ſo runs, it migrates from Line to Line in them; and paſſes from thoſe that it was firſt impreſs'd upon, to thoſe of different Tendency; without making any Alteration in the

Conſtitution of its Subject, or the Situation of its conſtituent Parts; it contracts itſelf into fewer Lines, or ſpreads itſelf into more. As, for Inſtance, ſuppoſe one common Stalk, or Stock of Iron, or what you pleaſe, forking itſelf out into ſeveral Branches; it is plain, that one Blow or Impulſe given to the ſingle Stock, diſtributes its Moment or Quantity equally amongſt the Branches, which they have amongſt them according to their Number, each a Third, Sixth, &c. And that the other way Motion impreſſed upon them all is receiv'd by the common Stock, that has the whole united *Impetus*, that was impreſs'd upon them all: Thus, ſtrike the broad End of a Wedge or Nail, or any thing pyramidical, that is big at one End, and grows ſmaller; the Motion that is impreſs'd upon more Lines at the larger End, falls all into thoſe that run directly to the Point; by which Confluence, the Point of a Nail or Wedge, being charged with the whole united Motion that was communicated to the Head, has in it the whole Force and Activity; and ſo owes its Penetration, not altogether to its ſharpen'd Point, but to the Increaſe alſo of Motion; which is the very Caſe of the Burning-glaſs: As, turn it t'other way, and ſtrike the Point, the Diffuſion of the Motion would make its Preſſure feebler at t'other End, than the Force of the Blow given was.

For it is from this Contraction and Confluence of Motion impreſs'd on the viſive

Syſtem by the Sun, that the Burning-glaſs has, as I ſaid, its Force; the Motion communicated to ſeveral Lines, deriving itſelf upon fewer, gives them a vivid Brightneſs, and fiery Activity, as much ſuperior to thoſe that have but their common Share, as theirs is to that of thoſe that the Sun does not impel at all; the flaming Speck, or *Focus*, that is made by the Burning-glaſs, is not any new Subſtance that is brought there; but is the ſame that was there before, only affected with more Motion that is thrown in upon it; and in like manner, by the Texture of the Solids, and the indirect running of the Pores in which the viſive Matter is contained, we may conceive how all the Alterations of Light and Viſion, thro' Glaſſes of any ſort, are effected, whether by making Objects ſeem leſs or greater nearer, or farther off, *&c.*

But I ſhall, at preſent only, as a Specimen, endeavour to ſolve particularly the *Phenomenon* of the Looking-glaſs, and ſeeing ourſelves, or other Things there, by my *Hypotheſis*, which paſſes as done by Reflection of Things from the Glaſs to us.

In order to which, it will be neceſſary, *Firſt*, To conſider, the Nature and Conſtitution of Glaſs itſelf.

That Glaſs is a fixed Fluid, we know; and in its State of Fixation and Solidity, retains ſeveral Properties of Fluidity, ſuch as a Smoothneſs and Evenneſs of its Superficies, tho'fartheſt removed from it in others; ſuch as Hardneſs, not yielding to Force impreſs'd, ſtrong Coheſion of its Particles together, &c.

The Form of its Conſtitution, and Connection of its Particles to each other, is like, or the very ſame with, that of Water, or of Air; thro' which the Lines of viſive Matter, in like manner, being preſs'd upon, run as thro' the Glaſs, till they are ſtopp'd behind. And its conſtituent Particles themſelves are in like manner equal, and all of the ſame Size and Figure; (I mean thoſe of the broad Plates of fine and pure Glaſs, ſuch as our Looking-glaſſes are made of) and its Pores, in like manner, are uniform; becauſe we ſee Objects thro' it almoſt as clearly as we do thro' the Air itſelf; from whence it is evident, that tho' the Glaſs appears both to our Sight and our Touch, to be ſo continuous and imporous a Body to us, that one would imagine it to be all ſolid, glaſſy Matter only, and that nothing could run thro' it, and there were no Room left in it, for any thing elſe to be reſident in it, or together with it, in the Place that it poſſeſſes: Yet, when we conſider again its perfect Tranſparency, and how perfectly we ſee Things thro' it, tho' it is between us and them, one would imagine that there were no ſolid Subſtance at all, nor any real Body interpoſed. What we feel and ſee, that we call Glaſs, is only what ſtops and terminates the Continuity of the viſive Appendix; and in looking thro' Glaſs, what we ſee and feel of it, is only what we cannot ſee thro', which ſo far as we do, we ſee no Glaſs at all, neither is there any in our way: And 'tis like looking thro' a fine Gauze; what we ſee of it is what makes us not ſee, and caſts a Dimneſs before the Objects on t'other Side.

From theſe Appearances of a Glaſs not only to different, but to the ſame Senſes; of being both a poreleſs Solid, and yet at the ſame time almoſt totally pervious, we may pretty well infer its Texture, and the Form of its Conſtitution, to make it conſiſtent with both theſe Characters.

And, *Firſt*, It is evident that its Pores, and its Vacuities, muſt be equal to its glaſſy Subſtance; and take up juſt as much of the Space that its Dimenſions are ſtretched thro', and the Place that it ſeems to us to fill, as its glaſſy Matter does.

For Example: If the Glaſs is a Foot Square, the Pores and Diſcontinuities of it, take up juſt half that Space; and the Matter of the Glaſs, did it cloſe up thoſe Interſtices, would but be half a Foot ſquare; becauſe we find it every-where as pervious as we do ſolid; which would not be, if the viſive or luminous Matter were not let thro' it, by as many Holes as are equal to its Stoppages; and had it not as many Pores, as it has

Particles or Parts of ſolid Subſtance; and not only equal and anſwerable to them in Size, but that the *Foramina* and the glaſſy Matter, are regularly and nicely diſtributed, and exactly diſpoſed, ſo that the Whole is a curious Piece of Chequer Work, an *Opus Teſſellatum*, as of White and Black, or of Light and Darkneſs.

And, *Secondly*, That theſe its Pieces of Chequer-work, are not large Splotches, but exceeding ſmall and minute; becauſe thoſe of neither Kind make any viſible or diſcernible Diſcontinuity, either in the Glaſs itſelf, or in the Sight of Things thro' it; but what breaks the Continuity on either Side, is leſs than what falls under either Sight or Feeling, to be an Object of Diſtinction; when we ſee Things thro' it, there is as one common Dimneſs ſhading them, as with a Veil caſt over them; but they do not appear to be punctuated or broken at all, by any Diſcontinuities, as they yet really are; but by Interruptions, that are ſo ſmall as to be inviſible, and which run all into one Piece partaking of both. The Images in the Glaſs are all made up of diſtinct and unconnected Points, whoſe Smallneſs and Nearneſs to each other cauſe an apparent Fluxion into Lines, like the Figures that Women draw with Charcoal-duſt thro' their pricked Patterns, by Pouncing, as they call it.

How ſmall the conſtituent Parts of the glaſſy Matter are, we may perceive by the Pores which are of the ſame Size, that will neither let the Particles of Water, or of Air, paſs thro' them; and how thick diſſeminated they muſt be, appears by their ſeeming Fluxions into one; for we ſee Images ſo intire and continuous thro' it, that the Subſtance of the Glaſs does not appear to hide any Part of them at all, as if there were no ſuch Subſtance in the way, and yet that Subſtance again at the ſame time appears as continuous, as if nothing paſt thro' it at all; how much of the Images appearing in it when pure, the Glaſs covers, we may perceive by what happens when it is dyed or diſcolour'd, when the Images appear to be all Blue, or Green, *&c.* and the Colour of the Glaſs covers the whole Object, when yet really none of the Object is ſo cover'd by it. It is the glaſſy Subſtance only that lies in the way ſo thickly diſſeminated, that it covers them over, and gives them that Dye; for ſo far as we ſee Objects in, and thro' the Glaſs, ſo far we ſee no Glaſs at all; and ſo far as we ſee the Glaſs, ſo far we ſee no Object at all in it, or thro' it.

The Friability therefore of Glaſs may not be altogether owing to the globular and glabrous Form of its Principles, which can only touch in few Points, and ſo can take no Hold of each other; but it partly at leaſt may be from the extreme Thinneſs of its Incloſures, that ſever all its Pores, and their ſo thick Diſſemination; for Glaſs, with reſpect to the viſive Matter, is a mere Conſtitution of Oilet-holes, a Set of Pipes; which as they are ſurpriſingly more ſmall, ſo are they no leſs ſurpriſingly more numerous, and thicker ſown, than the Pores which the Hairs of our Heads come thro', or thoſe of any other Bodies but Diamonds, whoſe Solids do not anſwer the Pores that the ſummary Matter fills up.

This being the Nature of the Conſtitution of Looking-glaſſes, let us now ſee, whether we cannot ſolve the *Phenomena* of ſeeing ourſelves, and other Things in it, better, than by the Hypotheſis of Reflection, which paſſes current, and which we content ourſelves with the Fancy of, tho' I cannot ſee any thing like it, or what ſhould induce Men to think of ſolving it that unaccountable way; for there is no more Reflection required to my ſeeing Things in a Glaſs, than there is to my ſeeing the Glaſs itſelf, or any Thing elſe; for we ſee both upon the ſame Terms. If we ſee the Glaſs itſelf by Reflection, then we ſee the Images alſo in it ſo too; for as ſimply and directly as we ſee the one, we ſee the other. I ſee my Picture in it, becauſe I ſee the Glaſs; which ſeeing or feeling with my Eyes, I neceſſarily muſt feel along with it, as with other Things, all its Accidents, as I do thoſe of other Bodies;

of which Accidents my Image there ſtopp'd, being one and inhering in it, occaſionally and conditionally, during the Condition; and, whilſt that holds, I am as ſenſible of it, as I am of the Qualities of any other Bodies, or thoſe of the Glaſs itſelf; and my Image is no more reflected to me from the Glaſs, than it is reflected from me to the Glaſs, or than the Blackneſs, and other Qualities of the Frame, or any thing ſticking to the Glaſs, is reflected from it. As I ſend my Image impreſs'd on the viſive Syſtem to the Glaſs, with all the occaſional Accidents of which it is the Subject, ſo meeting it there again, with my viſive Pole from my Eyes, I feel it with all the Adjuncts dependent on its Subſtance; of which my Image happening to be one, by perceiving the Glaſs, I of courſe perceive it; but no more by any imaginary Reſult, or Rebound from it to me of any Rays or Light, than if I ſpit on the Glaſs, or threw a Piece of Dirt that ſtuck to it, ſuch Dirt or Spittle ſeen, could be ſaid to come back to me by Reflection. I do not ſee myſelf in the Glaſs by any repercuſſive Act, or Virtue of the Glaſs, but by a dependent Concomitancy of my Image upon the Glaſs that is become its Subject, and is an objective Part and Circumſtance of it; which ſtands in the ſame State of objective Relation to me, that the Glaſs itſelf ſtands in, or any Thing elſe that I ſee ſimply and directly; and as the accidental and ſudden Alterations made in any Bodies, are perceived along with them. Did my Image, when it came to the Glaſs, rebound, and jump back upon me from it, leaving the Glaſs behind, then it would be ſuch Reflection, as is imagined; but inſtead of its doing ſo, or coming back out of the Glaſs to meet me, being ſtopped or ſtamped in the Glaſs, there it bides; and is ſo far from appearing to be reflected from it back to me, that I perceive it plainly ſunk into it, and behind it, and as within, in an inner Room, and as having paſſed thro' the Glaſs as far from it backward, as I am from it before, quite contrary to the Fancy of Rebounding and Reflexion.

But the moſt extravagant Conceit of Reflection is, our fanſying that the Light of the Sun is reflected to us from the Moon; and that the Sun over-ſhooting the Mark, flings his Rays with that Violence againſt the Moon's Orb, ſo far beyond us, that they leap ſo many thouſand Miles back again to us; a Rebound too monſtrous, one would think, to paſs as it does. When the Superficies of the Planet is brightened by the vigorous Appulſe of the viſive Fluid againſt that Portion of it that is turned towards him and us, by the Activity of the Sun we ſee that Part plainer than we did before; but by no more Reflection of any ſolar Rays from it to us, than when we ſee a Houſe, or a Wall, that whilſt it had its native dusky Hue, was too far off to be viſible to us, by being whitened can be ſaid to be ſeen by Reflection. When the Colour of any Body is altered by Change from darker to lighter, we ſee it plainer by the ſame direct Intuition than we did before; and ſo we ſee the Moon, that being of that watery or glaſſy Nature as to derive the Motion that the Sun had charged upon the viſive Fluid down to it, into Lines of different Tendency back towards us, by that Increaſe of their Motion in thoſe Lines, makes an Increaſe of Light to us; not that ſuch Motion can be ſaid to be reflected by proſecuting its Courſe thro' its Subject by Lines of contrary Tendency to thoſe it was firſt impreſſed upon, anſwerable to thoſe of their Incidence.

But in order to explain this Phenomenon of ſeeing ourſelves, or other Things, in a Looking-glaſs, I ſhall endeavour to anſwer theſe three Queſtions:

Firſt, How, and by what Means, my Image comes into the Glaſs?

Secondly, By what Means I ſee it there?

And, *Thirdly*, How it comes to face about and look towards me, whilſt I look the contrary way; and the Sides, or Right-hand and Left, to be inverted?

And, *Firſt*, then, By what Means come our Images to be ſtruck in the Looking-glaſs?

Before our Philoſophers had reſolved which way we received our Images from the Glaſs back again, and that it was done by Reflection, or Rebound, they ought to have given us a ſatisfactory Account how they firſt came there.

Now it is certain, that they cannot be firſt ſtruck in the Glaſs, where they firſt appear to us; but that they muſt have been ſtruck upon ſomething elſe, before they came there; now this Something that they were ſtruck upon before, muſt be ſomething that is cloſe to us, and that our Bodies immediately preſs or touch; and which either by their preſſing upon it, or by its preſſing upon them, by ſuch Preſſure takes off our Forms; and this muſt be ſomething alſo that is continued from us to the Glaſs, ſo that whilſt it touches us at one End of it, it touches, in like manner, the Glaſs at t'other; it is no leſs certain, that it is not a ſuperficial Impreſſion made at that End of it, that touches our Bodies, like what is printed or ſtamped on the Outſide of Bodies, which goes no deeper into them than the Impriment went: But that it is a thorough Impreſſion, that is, ſuch a one as runs quite through the Matter it is impreſſed upon, from us, till it is ſtopp'd in the Glaſs where we ſee it, and is the ſame perfect Image all the way; for in every Part of the way we have it the ſame. Conſequently, this Matter that receives this thorough Print, by one gentle Touch only, or

Preſſure of my Body upon it, muſt be not only incomparably yielding, but continuous, ſimple, and homogeneous, and within itſelf a *Plenum*; that is, ſuch whoſe Parts and Particles cannot be preſſed inward cloſer to each other than they naturally are; but ſo that a Preſſure of it at one End of any given Pole of it, muſt make it anſwerably preſs ſomething elſe that reſiſts it at t'other End; or if there is room for Ceſſion, yet it muſt not be of its Particles cloſer to each other, but of the whole: So that, if a Dent is ſuppoſed to be made inward at one End, it muſt force an anſwerable Bulge outward at t'other; and we accordingly find that our Images impreſs'd run the very ſame quite thro' the whole Space between us and the Glaſs, and tho' inviſible to us, till they come at the Glaſs, and till that ſtops and turns them back upon us.

Now this Matter that we impreſs our Images thus upon, cannot be Air, becauſe then the Glaſs alone would ſtop the Image, and there would be no need of the Quickſilver behind it to do that Office; whoſe Uſe ſhews that the Figure is not impreſs'd on Air, which Glaſs, by Experience, is found to ſhut out, as we find by the Air-Pump; which alſo ſhews us that Light has no natural Relation to, or Dependence on Air, becauſe when the Air is drawn out of that Machine, there is no Alteration made in the Light within it. At leaſt, were it Air, yet it could not paſs thro' the Glaſs with that little or no Interruption, ſo as to tranſmit intire Images thro' it, without any apparent Breach of Continuity in them: And it muſt therefore be ſome Fluid that is much ſubtler than Air, and to whoſe Particles, both as to Size and Figure, the Pores of the Glaſs are conformable, and which I therefore conclude to be the viſive Syſtem; which being incomparably ſubtle, and ſuſceptible of Impreſſions, lays juſt Claim to its having thoſe aforeſaid Properties neceſſary to anſwer its Effects.

But tho' I call the Figure of my Body that is ſtruck or drawn on the viſive Fluid, and that appears in the Glaſs, an Impreſſion, yet I queſtion whether it is properly and perfectly what we mean by that Name; for Impreſſion ſpeaks a Ceſſion of the Particles inward, on the paſſive Matter's Side that is impreſs'd upon, by their being cruſhed and ſqueezed in cloſer together, and into a leſs Compaſs, and ſuppoſes ſome Degree of Reaction and Reſiſtance made to the Impriment: And Fluids therefore, eſpecially the ſubtle and volatile, cannot ſtand or ſuffer ſuch Impreſſion; becauſe they both fly before the Impriment, as faſt as they are preſs'd upon by it, and cloſe again as faſt as that can be withdrawn from them; and tho' they nicely receive the Form and Characters of the Impriment upon them, and are exactly inſcribed with all its Features and Lineaments, ſome of their Particles retiring from it before others, according to the Order they are touched and preſſed upon by it, thoſe that are more extant and prominent, before the indented Lines and Furrows; yet cannot ſuch Figures impreſs'd upon them, be perceived but by the Impriment itſelf, when it is a vital and animate one; or by the paſſive Fluid itſelf, when that is ſo; becauſe ſuch impreſſed Characters are, and laſt only while they are making, and ceaſe again to be, as faſt as the Act of making them ceaſes; which being over, leaves no Footſteps of itſelf behind: And Fluids therefore are ſo fugitive, that they will receive no Impreſſions, but, as one may ſay, ſpontaneouſly; by being themſelves the Aggreſſors, and both Agents and Patients; not being preſſed upon, but preſſing themſelves on ſolider Conſtitutions; and their Impreſſions in that State being imperceptible unleſs to themſelves, becauſe they vaniſh with the Diſcovery. So there is no other Way to make them retain Impreſſions, but by their being changed into Solids. Thus we melt Metals into Fluidity, to make them run themſelves againſt the Mould; and ſo receive the Marks of its uneven Superficies; and by ſtiffening them into their native Solidity again, make them retain them, when the Mould is taken away.

For Example: As I ſtand before a Looking-glaſs ſtrictly incloſed, and clipped round with the viſive Fluid circumfuſed, that preſſes itſelf every-where upon me, as all Fluids naturally do on Bodies that are immerſed in them, by a *Niſus* to cloſe themſelves, and heal the Solutions of their Continuity broken by ſuch intruding Bodies, I am as a Mould to the fluid Incloſure that is round me; which receives in it all the Lines and Characters of my Body's Superficies and Face; juſt as by a Mask of Plaſtering ſpread upon the Face, its Features and Lineaments are taken off; but ſo much more accurately, as ſuch a ſubtle Fluid complying with every the ſmalleſt Line, and ſinking into every Pore, muſt more livelily expreſs what the other's coarſer and ſtiffer Temper made it incapable of being forced into Compliances withal.

The Features of my Face, ſuppoſe, thus being taken off by the viſive Fluid, by Virtue of its Purity and Plenitude, run on in it from my Face, as far as the Continuity of it goes uninterrupted, and whilſt it meets with no Obſtruction; which in groſſer Fluids, ſuch as Water, and our muddy Air, is not far indeed, becauſe they are neither ſimple Fluids, nor perfectly continuous, but are broken and irregular Conſtitutions, mixed up with a great deal of diſſimilar Matter. So Impreſſions received by them, proceed not far in them with Integrity, and any tolerable Perfection, being ſtopp'd and broken by perpetual Interruptions; but the viſive Fluid being ſimple in itſelf and continuous, tranſmits the impreſs'd Forms of Bodies to the greateſt Lengths, as exactly as if the Prement itſelf paſs'd all the way thro' it. Thus the Stars and Heavens, we find at ſuch a prodigious Diſtance, preſſing their Figures upon it, it preſſes the Quickſilver behind the Glaſs, or the Ground under the clear Water, exactly in the ſame Form, that it was preſſed by them above; and thus my Body impreſſing itſelf upon it, that Preſſure is as a continued Seal all the way thro' it, from me to the Glaſs, till going thro' the Glaſs, it diſcharge itſelf againſt the Quickſilver behind it; which ſtops it with the ſame Form of Preſſure received from it, that it received from my Body; and there ceaſing to be farther an *Imago imprimens*, it becomes upon the Quickſilver as an *Imago impreſſa*, and a perceivable Object. I ſay as an *Imago impreſſa* only, becauſe it is not really ſo, any more than my Shadow againſt a Wall is ſo, that is made by the various Preſſure of the viſive Fluid, and its unequally falling upon it, and by my Body's keeping it off; which, according as it is affected by various Touch, acts the Figures of Bodies by Light and Shade, and whilſt it repreſents its own different Paſſions, by my perceiving them they become my own.

Having thus brought my Image to the Looking-glaſs, and lodged it there, the next Queſtion is, *Secondly*, To conſider, By what Means we come to ſee it there?

The Circumſtances of this *Phenomenon* are ſo particularly forbidding to the Solution of it by Reflexion, that I wonder how that abſurd Way could be thought of to do it by. If it is by Reflexion that I ſee my Image in the Glaſs, then, Why is it not reflected from it? Why does it appear to me in the Glaſs? and, Why ſtays it there in a Situation ſo far from promiſing Reflexion, that inſtead of coming towards me, it ſhews itſelf as far beyond the Glaſs, as it is from me to it? If it was reflected, it ſhould come back home to me, or, at leaſt, come out of the Glaſs ſome part of the Way, to meet my Eyes; or, if it was by any ſecondary Image that was conveyed back to me, I ſhould either perceive it in that State, or in my Head, as I do Ideas; and to ſuppoſe it to be reflected, is to ſuppoſe Nature to put the greateſt Trick and Abuſe upon us, ſhewing us an Object where it is not; and we muſt belye our Senſes, and believe in Contradiction to that very Senſe that diſcovers it to us, if we do not believe that the Images that we ſee in the Glaſs are not as really behind it, as we ourſelves, whoſe Images they are, are before it; for it is the ſame Evidence of the ſame Senſe that tells me that I am before the Glaſs, that tells me at the ſame time, that my Picture is behind it.

Beſides, the Thing itſelf is ridiculous, that I ſhould ſend my Picture abroad ſo far off, only to come back again to the ſame Place it went from, to be perceived.

It is true indeed, that in like manner as the viſive Fluid receiving the Form of my Body preſſed upon it, carries that from me to the Glaſs, ſo receiving the Glaſs's Repreſſure alſo upon it, it would bring that in like manner to me; and ſo my Image, ſtopt in it, would of courſe come back to me along with the Glaſs, as an inherent Accident in it; and were I an inanimate Body, this would be done, and ſo indeed there would be a Return back of my Image to me; but this would not be by way of Reflexion at all, but of ſimple and direct Intuition; and as my Image is become an Accident depending on another Subject, in which it has gained itſelf a new Settlement of Inexiſtency; but by my being animated, even a Return of it this way is prevented; ſo that inſtead of the Form of the Glaſs's Preſſure upon the viſive Fluid reaching home to me, it is I that reach home to that: And by that Pole of viſive Matter that is ſtretched between us, being united to my viſive Fluids, and thereby to my Soul, I, upon the Spot, immediately touch the very Glaſs itſelf in its proper Place; and ſo by that Appendix added to my viſive Fluids, I feel the Form of the Glaſs's Preſſure, not as upon forreign and heterogene Matter, but upon my own very Self and Subſtance;

ſtance; and I accordingly, without any intervening Idea, really and truly perceive the Glaſs with all its Accidents in its natural Place; being as indiſtantly and ſubſtantially preſent to it, as if I touched it with my Finger, as I do indeed with my Eyes. And with regard to the mutual Impreſſions that the Glaſs's Body and mine do make upon the viſive Fluid, there is this Difference; that tho' I, with regard to it, am diſtant from the Glaſs, yet the Glaſs is not in like manner diſtant from me; and therefore, tho' the Figure of my Body printed on the viſive Matter, wants a Conveyance by Continuation to it to reach the Glaſs, yet the Glaſs's Preſſure of itſelf on that ſame Fluid wants no ſuch Conveyance to me; but is ſuperſeded by my being preſent to it, and prevented: For I, on my Side, have a natural Union to, and Connexion with, the viſive Fluid; but the Glaſs, on its Side, has no ſuch Connexion. So that, were a Poſt in my Place, the Glaſs's Picture with the Poſt's in it, would come back to that; but my Eyes are too nimble, and ſave the Impreſſion the Trouble of that Journey, by being with the Glaſs, and my Image in it, where and whilſt it is made; as, were the Glaſs on its Side vital and animated, inſtead of receiving my Image, as it does, into it, it would receive myſelf at this End of its viſive Pole, as I do it, with mine.

The Form of my Body imprints itſelf upon every other ſolid Body, as perfectly as it does upon the Looking-glaſs; and the Reaſon that I do not perceive it in other Bodies as well as in the Glaſs, is, becauſe Glaſs, as I have obſerved, being every-where foraminous, with reſpect to the viſive Fluid, and being a mere Sieve and Conſtitution of infinite Oilet-holes, that are rectilinear, and thoſe its Pores running parallel to each other, not only directly from the Face of it, but in all Degrees of Deviation of Angles, from the moſt acute to the moſt obtuſe, to anſwer all Incidences by which the viſive Matter can be preſſed upon it, having oblique Pores ſo anſwering to, and terminating in, each other, that, where-ever one Pore ends, another meets it in the ſame Degree of Obliquity, ſo that there is every-where a Pore of Return open, anſwerable to that of the Incidence of the viſive Matter upon it; and the Pores being configured to the Particles of the viſive Fluid, it gives every-where, and every way, as free Paſſage to the viſive Matter, and the Continuation of its Motions thro' it, as Water or Air for the ſame Reaſon do, to whoſe Conſtitutions Glaſs, as I have ſaid, is conformable. And the Quickſilver behind being as perfectly imporoſe and impervious to the viſive Matter, and exactly corking, and ſtopping, and ſealing up the Orifices of the *Foramina* behind, ſo as to turn every Pore, as to the farther Progreſs of the viſive Fluid, into an Angiport; and the Lines and Threads therefore of the viſive Fluid, that are charged with the Form of my Body's Preſſure upon them, preſſing into theſe Pores that are thus ſtopp'd behind, are there inevitably caught and ſecured, without Poſſibility of Eſcape, having no other Way back, but either by the ſame Pores by which they came in, or by others anſwerable to the Angles of their Preſſure's Incidence; muſt neceſſarily diſcharge againſt the Quickſilver, that Form of Preſſure which they received from my Body, and ſecured from Diffluence and Declination, or glancing aſide, the Matter being ſo wedged in between the impervious Sides of the Glaſs's Pores, that it muſt communicate the Preſſure charged upon it faithfully againſt the Quickſilver, without Poſſibility of Diſſipation, or Diverſion, or its ſlipping off into Lines of any other Tendency.

And theſe Lines of the viſive Fluid, that are thus charged with the Portraiture of any Body upon them, being united to my optick Fluids, and made an Appendix to them, perceive the Quickſilver preſſing them back upon them with the ſame Form of Motion that my Body preſſed them to it.

So that what I call my Image in the Glaſs, is the Form of that Preſſure which my Body gave to the viſive Matter incloſing it; which running from me to the Glaſs, is there ſtopp'd, and turn'd back upon me;

which I there feel with the End of my viſive Pole; and that ſame Matter that I impreſs the Form of my Body upon, and that conveys it from me to the Glaſs, is what I perceive it withal, when it comes there; and I am at one End the Impriment, and at the other the Percipient of what I impreſs; and with that ſame Matter, which my Image is ſtruck upon, perceive it.

The Diſtance of Objects, and the Space from them to the Glaſs, is none of the leaſt curious Part of the *Phenomena* of the Looking-glaſs; How ſuch a Depth of Space ſhould be ſo evidently and exactly exhibited to us in *plano*, crowded all into a Superficies that has no Depth? But without entering at preſent upon this, or more Phenomena of the Looking or other Glaſſes, I ſhall only take as granted that this is a faithful Repreſentation, and anſwers the State of Relation, and reſpective Situations of Things to their Images in the Glaſs; and if ſo, it effectually contradicts the Notion of ſeeing ourſelves by Reflection, which inſtead of reflecting to us, it ſends juſt as far again from us, as itſelf is, and as we really are.

It obliges us to think, that the Place of the Image's Exiſtence is farther from us, than the Diſtance is from us to the Foreſide of the Glaſs itſelf, becauſe it appears beyond it; and conſequently, that the true Place of the Image's Exiſtence is the

Quickſilver in the Glaſs itſelf, which only is ſo, and the fartheſt Thing that I can ſee.

All Bodies preſſing the viſive Syſtem, by it preſs their Figures againſt every other ſolid Body, as well as againſt Looking-glaſs; but other Bodies, either by reaſon of their ragged and ſcabrous Superficies, the Irregularity of their Conſtitutions, the Crookedneſs of their Pores, or Unſuitableneſs of them to the viſive Matter, give the Impreſſion no perfect Settlement in them; ſo that the ſmootheſt and beſt-poliſhed Superficies of Wood, Stone, Metal, *&c.* ſhew our Images much more faintly and obſcurely than Glaſs does, and we muſt put our Eyes nearer to them to ſee them; becauſe the Rectilinearity of their Pores is but ſhallow, and the Stoppage behind neither perfect nor uniform, ſo neither receives the Form of Motion impreſſed upon it perfectly, nor directs it faithfully back again; the Figures appear as dancing and floating as in the very Superficies without Diſtance exhibited, and the impreſſed Motion ſpattered, and the viſionary Scene incomplete.

The *Third* Queſtion propoſed is, How the Image of my Face in the Glaſs comes to turn upon me, and look towards me, when I look the contrary way; and my Sides, and Right-hand and Left, to be inverted?

This is the common Caſe of all Impreſſion, and is what each Seal and Bit of Wax is perpetually exhibiting to us, where the adverſe Poſture of the Impreſſion to the Imprimeṅt that confront each other, moves no Scruple to any body. And were we not ſtrongly prepoſſeſſed with the Fancies of Rays and Reflections, this *Phenomenon* itſelf alone were enough to convince us, that our Faces turned upon us in the Glaſs was the ſame Thing done the very ſame way; and that I am but the Seal, and my Image that I ſee in the Glaſs, is the Impreſſion that I make; and that all the Difficulty that wants Solution, is, the ſeeming Diſtance of me the Impriment, from my Impreſſion.

Now, as it is certain that nothing can act upon that which is really diſtant from it, and that a Seal held up at one End of a Room, cannot ſtrike a Coat of Arms upon ſomething that is at the other End, without ſome ſuch Thing between them as makes an immediate Correſpondence, however inviſible and non-apparent that may be; ſo finding here, that I am the Seal to my Image in the Glaſs, it leaves no Doubt, whether there is ſomething that is immediately preſent to me, that I preſs my Image upon, and that the Thing muſt be done that way; but it only puts us upon caſting about, to find out which, and what, this non-apparent Something is; and why I do not perceive the

Thing itſelf, but in its Effects and Paſſions only? And why not, till they are at ſuch a Diſtance from me, tho' wrought immediately by me?

We perceive nothing but what reſiſts us, and puſhes back upon us; ſo far as Things yield and fly before us, in that State they are imperceptible to us, till we can make them come againſt us; and the viſive Fluid, I have obſerved, is too yielding and fugitive as well as too ſubtle to be ſeen, to fix any perceptible Impreſſion upon; ſo long as it is, as it were, in open Ground, and under no Confinement, and ſo long as it can any way retire or ſlip aſide, and avoid the Prement's Force; and, like a wild Colt, is not to be apprehended, but by being driven and forced up into ſome Corner, where it can neither go farther, nor ſlip back by us: So it is with the viſive Fluid, with regard to the Form of my Body's Preſſure upon it; the Motion received flies before thro' it, till preſſed into the Pores of the Glaſs, whoſe Sides are impervious, and cloſely cemented; and having now no longer room to retire or avoid, 'tis there ſtopp'd and turn'd back upon me by the Quickſilver, and is there met, and, as it were, caught by my optick Fluids lengthened out, that were its Vehicle thither; and, forced back upon them by the Quickſilver, with the ſame impreſſed Form of Motion that they came againſt it withal; and this thus ſtopp'd and repreſſed Form of Motion, is what I perceive, and which conſtitutes my Image; as neither does a Seal make any Impreſſion in the Wax, ſo long as it yields and retires; but when it can go no farther back, then, at laſt, it ſubmits to bear the Impreſſion; when Something, doing the Office of the Quickſilver, drives it back upon it, in the ſame Manner that the Seal drove it forward; and, were the Seal alive, it would ſee its Impreſſion, juſt as we ſee our Faces in the Glaſs, looking towards it.

We ſee each other with our Faces looking towards each other, but not upon the ſame Conditions that we ſee ourſelves in a Glaſs, but upon thoſe upon which we ſee the Glaſs itſelf; that is, not by any Impreſſions made by them in the viſive Fluid; but, at the firſt Hand, by the Originals themſelves immediately impreſſing themſelves on our viſive Fluids mutually lengthen'd out to each other; not by any Impreſſions drove backward to us; for then we ſhould ſee our Faces not looking towards, but from each other; and being on the wrong Side of a ſuperficial Image, that has none, ſhould ſee the right Side; or, which is the ſame Abſurdity, ſhould ſee the Outſide of our Inſides, or our Foreſides, thro' our Backſides; as Children fanſying their Pictures in the Glaſs to be like thoſe wove in Tapeſtry, or painted on ſomething with real Colour, peep behind it, to ſee t'other Side of themſelves: For Impreſſions, and whatever is ſuperficial, has but one Side, and is all right Side without a wrong, or Foreſide without a Backſide. What I impreſs in the viſive Fluid, is the Outſide of my Face or Body, and 'tis that Outſide only that I muſt ſee, becauſe that was only objected to me; and ſuppoſing ſuch impreſſed Form to come to me, it muſt then come to me backward, as it goes from me to the Glaſs, and yet I muſt ſee it forward. Let my Image go to the Glaſs which way it will, I muſt ſee my Face in it looking towards me, or not at all, becauſe that only was preſented to it. And for my Sides, and Right and Left, ſeeming to ſtand inverted in my Picture on the Glaſs, and reſpecting contrary Parts of the World to thoſe of my Body, it is what is conformable to the real State of the Archetype; and my Hands and Sides ſtand the ſame way in the Image that they do in my Body, and receive no other Alteration from the accidental Circumſtance of Poſition, and reſpect to my Body, and the Parts of the World, than any Body, and every one's Body does; and it is no ſtranger in my Picture in the Glaſs, than in my Picture that is hung up in a Room, and in every Man that I meet, and turn but my Face the way the Picture looks, or the Picture the way that I look, and all is ſet right: And I may as well wonder at the Glaſs's Right-ſide anſwering my Left, as my Picture's, which, whilſt I ſee it, is Part of it, doing ſo.

The Colours and Complection of Bodies that are expreſt in the Looking-glaſs, together with their Figure, is a notable Part of the *Phenomenon*; and is a Demonſtration that Colours are intirely dependent on the Superficies of Bodies; and that their Differences and Variety are cauſed by the various Touch with which they wound and affect the Syſtem of Light, whilſt it claſps them round; for it is not any Taint or Infection that is communicated together with its Form to the viſive Matter, that dyes and ſtains my Picture in the Glaſs with my various Complexion, nor is it any Thing that goes off from my Body that is communicated to the Quickſilver, that tinctures it ſo to the Life with the Colours of my Face, by any Change of Colour, either in the viſive Fluid, or in the Quickſilver which cauſe the Tranſitions in them from Colour to Colour, and ſhifting the Scene as quick as Thought; but it is only the Form of Preſſure on the viſive Fluid, that is alter'd and diverſified; which, as it is otherwiſe and otherwiſe moved and affected by the Preſſure of Bodies exiſting in it, affects us with that Variety of Senſations, which we call their Colours, which are but the different Forms of its, and our Paſſions.

That all Impreſſions do not take off the Colour as well as the Figure of their Impriment's Superficies, as well as thoſe in the Looking-glaſs, is from want of Accuracy only; did the Wax take exactly the Superficies of the Gold Seal, the Impreſſion received from it, would be Gold colour'd; and Blue, or Green, if impreſſed by a Saphire or an Emerald; but Solids, or impure Fluids, receive but Impreſſions after a rude and clumſy Rate; they take off only ſome ſtrong Lines and notorious Characters, that are deeply engraved, and, as it were, ploughed into Furrows, and extant Ridges, and groſs Unevenneſſes; but carry not off with them the more curious Strokes of the Texture of the Superficies of Bodies; their Particles are too big, and too rigid and ſtubborn, and their Coheſion and Conſtitution too ſtrong to comply with all the minute Circumſtances of Configuration that are what give that Air and Bluſh to the Superficies, that we call Colour. The viſive Matter only receives thoſe delicate Touches from Impriments that expreſs their Colour; which we cannot perceive by the Organs of any of our other Senſes; not but the animal Fluids in themſelves, in any Part of our Bodies, may be nice enough by the varied Form of Touch from the Superficies of Bodies to diſcern their Colours, as well as thoſe of the Eye; but they do not in other Parts ſo immediately touch their Objects, as thro' the Eye; they have the Diſadvantage of perceiving thro' a Veil of Skin interpoſed, which breaks the Communication; ſo they feel not themſelves preſſed upon, unleſs by comparatively ſtrong and more rugged Impulſe, that bulges in that Membrane upon them with ſome Degree of Violence; ſo that if Bodies are very ſoft, ſmooth, delicate, or not ſufficiently preſſing, we are forced to call in the Aſſiſtance of the Eye often, to know whether we touch any thing, or not.

Thus it is the Form and Quality of the Preſſure of Bodies upon the viſive Syſtem, that gives them their Colours; and it is the Paſſions of that Syſtem united to us whilſt we ſee, and by that Union making its Paſſions become our own, that we are ſenſible of, and learn by Experience the relate Qualities of the Bodies that cauſe them to us.

Thus has the Wiſdom of our Creator, by wonderful Diſpoſition, with ſurprizing Eaſe, by various Modes of feeling ourſelves affected, made us perceive all other Things, and their Relation to us; and whilſt we perceive really and immediately nothing but the Effects and Alterations that are wrought inwardly in ourſelves by Motion, he has made us perceive every thing that relates to us without us; and by a Syſtem of Matter, that is itſelf inviſible, has made all Things viſible and manifeſt to us.

FINIS.

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